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2008
PRODUCT
CATALOG

DATA COMMUNICATIONS
WIDE AREA NETWORKING
WIRELESS CONNECTIVITY

Toll Free:
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Pulse
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Solutions for VoIP, Wireless, Wide Area Networks and Datacomm

Pulse is a worldwide Value Added Distributor of Data Communications, Wide Area Networking and Voice over IP products and solutions. We provide innovative solutions and comprehensive know-how to assist companies or organizations in advancing their technological goals.

Pulse is a leader in solutions for IP, VoIP, Wireless, SONET, Frame Relay, Signaling and Interface Conversion, Voice Compression and last mile extension. We utilize these technology standards with time proven methodologies to enhance our customer's competitive capability.

Pulse was formed to provide a source for superior Data Communications and Telecommunication products along with consulting services at competitive prices. We use a consultative approach, developing a needs assessment through dialogue with our clients. We are committed to designing and delivering solutions today that meet or exceed our customer's requirements, and carry them forward into the next generation of products.

Pulse provides a multitude of services which include consulting, network design, network analysis, systems integration, installation, maintenance contracts and product distribution.

For our clients, the right solution provides quick, secure access to the right information from anywhere within an organization to anywhere in the world, and that requires experienced systems integration. Our solutions are designed and managed to not only reduce expense, but to improve business processes, accelerate response time, improve services to end users, and give our clients a competitive edge, now and into the future.

Our range of services and products are carefully selected to complement each other to meet our clients' business needs. Whether designing or configuring a line of business solutions, we securely extend the solution to the Internet, integrate with enterprise and legacy systems, create stand-alone and mobile applications, deliver business intelligence and provide infrastructure support and maintenance services.

Pulse has created partnerships with leading manufacturers to enhance its solutions. By leveraging these relationships, we can design cost effective solutions while providing a genuine return on investment. In addition, we provide a single source for all your networking requirements, hardware, software, support and services.

At Pulse, we look forward to building business relationships and personal service with our customers. Contact your local Pulse office or representative today and let us be a valueable extension of your organization or enterprise.

RAD data communications
ADTRAN
Hypermedia Systems Ltd.
QUINTUM TECHNOLOGIES, INC.
SOLUTIONS 11 talking platforms...
exinda networks
AudioCodes
BridgeWave
pbxnsip
U4EA technologies
EION WIRELESS
Redline communications
MRV
encore networks

Capability Overview

Solutions for VoIP, Wireless, Wide Area Networks and Datacomm

Data Communications

Wide Area Networking
Traditional solutions including TDM and Packet based equipment and last mile termination.

Ethernet and IP Extension
Solutions to extend Ethernet and IP over copper, fiber and wireless technologies.

Interface Conversion
Solutions for converting legacy and modern interfaces.

IP Optimization
Packet Based traffic management, Quality of Service and Load Balancing.

Signaling Conversion
TDM based voice signaling conversion. Support for popular standards such as DTMF, R2, SS7, C7, SIGTRAN and more.

SONET/SDH Solutions
Hardware based solutions for converting, extending and terminating SONET and SDH applications.

Test and Access
Solutions for circuit testing and non-intrusive access.

TDM over IP
Transparent T1/E1,T3/E3 data and voice over IP via pseudowire technologies.

Voice over IP
Hardware and Software for the implementation and migration to VoIP. Addressing Service Providers, Carriers and Enterprise.

- PBX
- Class 5 Softswitch
- LCR Routing
- Wholesale Termination
- Low to High Density Media Gateways
- GSM, CDMA, UMTS integration
- Class 4 Softswitch
- SBC
- Calling Card

Voice Compression
Solutions to compress digital E1/T1 and Analog voice circuits.

Wireless
Solutions in licensed and unlicensed Microwave, WiMAX, Millimeter Wave and Free Space Optics.

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Web Sites
www.pulsewan.com – Corporate Website
www.pulsecom.com – VoIP Solutions Website
www.airmux.com – Wireless Solutions Website
www.gopackets.com – E-Commerce Website
www.talkingplatformsusa.com – Strategic Alliance

Data Communications
Wide Area Networking
Ethernet and IP Extension
Interface Conversion
Signaling Conversion
IP Optimization

SONET/SDH
TDM over IP
Voice over IP
Voice Compression
Wireless
Services and Support

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www.pulsecom.com – VoIP Solutions Website
www.airmux.com – Wireless Solutions Website
www.gopackets.com – E-Commerce Website
www.talkingplatformsusa.com – Strategic Alliance

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TDMoIP Multiplexers.....Inside Back Cover

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Rated as one of the top IT Portals on the Internet!

Data Communications and Telecommunications

Multiplexers
Inverse Multiplexers
xDSL Modems
Voice Compression
VoIP
Fiber / Broadband
Routers / Bridges
DACS, BW Managers

Wireless Broadband Solutions

Point to Point
Point to Multipoint
Licenced/Unlicenced
Sync/Async Data
Ethernet
T1/E1

Trunk Signaling Converters and Gateways

Pulse specializes in complex voice trunk signaling solutions.

T1/E1, SS7/C7, A-Law / U-Law, DTMF / MF, R1, R2, C5, DECADIC, Pulse / DTMF, Loop Start / Ground Start, Line Connect Supervision, Line Disconnect Supervision, Custom Configurations

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T1 Integrated Access Devices

Battery Backup Option

Total Access 600

Total Access IADs

With millions of small- to medium-sized enterprises existing today, the requirement for carriers to provide integrated voice and data solutions is growing at a rapid rate. ADTRAN® delivers with Total Access Integrated Access Devices (IADs). The Total Access 604, 608, 612, 616, and 624 are cost-effective, fixed-port, IADs designed to support either TDM or emerging packet architectures. These IADs offer enterprise users and integrated communications providers, such as CLECs, ILECs, and ISPs, a means to offer combined voice and data traffic over a single network interface terminating at the customer's premises. The Total Access 612 provides 12 fixed analog voice interfaces, while the Total Access 616 provides 16 fixed analog voice interfaces, and the Total Access 624 provides a full 24-port voice capacity for large voice applications. These analog FXS interfaces support the stringent design and full feature set required by today's carriers. Total Access 600 series IADs provide a built-in IP router and Nx56/64 V.35 port for synchronous data applications, allowing the customer to combine a broad variety of voice and data services into a single platform. Total Access IADs are compatible with industry-leading DSLAMs and voice gateways for VoATM and VoDSL applications. The FXS interfaces support all popular CLASS ™ features, and an additional Assured Dialtone™ analog interface is provided for Lifeline POTS.

Built with the carrier in mind, the Total Access 600 IADs are housed in a rugged metal case and provide the flexibility needed for quick turn-up in harsh environments. Wall and desktop mounting options are available for ease of installation. An optional ADTRAN battery backup system is available for added security.

The integral IP router provides a powerful suite of performance and security features. Each Total Access 600 IAD offers multiple PVC configurations for simultaneous access to the corporate network and the ISP. Supporting NAT/PAT and packet filtering, Total Access 600 IADs secure the corporate network from unwanted intrusion. All configuration options, testing parameters, and passwords are accessed through an easy-to-use VT100 terminal interface or a TELNET session using the 10/100BaseT port.

Using local or remote inband management, the service provider can turn features, functions, and access ports on and off. For network access, the Total Access 600 IADs have a single T1, SDSL, or SHDSL interface that is compatible with today's industry-leading DSLAMs. In addition to all of these features, the Total Access 600 IADs are backed by an industry-leading 10-year warranty and ADTRAN's 24-hour technical support.

Equipment	Order Number
TA 604 T1 TDM	ADTN4203641L1#TDM
TA 604 T1 ATM	ADTN4203641L1#ATM
TA 604 T1 SDSL	ADTN4200642L2
TA 608 T1 TDM	ADTN4203681L1#TDM
TA 608 T1 ATM	ADTN4203681L1 #ATM
TA 608 T1 SDSL	ADTN4200682L2
TA 612 T1 TDM	ADTN4203612L1#TDM
TA 612 T1 ATM	ADTN4203612L1#ATM
TA 612 T1 SDSL	ADTN4200612L2
TA 616 T1 TDM	ADTN4203616L1#TDM
TA 616 T1 ATM	ADTN4203616L1#ATM
TA 616 T1 SDSL	ADTN4200616L2
TA 624 T1 TDM	ADTN4203624L1#TDM
TA 624 T1 ATM	ADTN4203624L1#ATM
TA 624 T1 SDSL	ADTN4200624L2
TA 600 BATTERY BU	ADTN1200641L1

DROP/INSERT DSX-1 PORT AVAILABLE TOO!

ADSL, SHDSL Versions also available
ADPCM Voice compression
availabele for 612, 616 and 624

See page 10 for more Total Access Products

T1 Integrated Access Devices

ATM Integrated Access Device

LA-140 is an ATM Integrated Access Device (IAD) that enables service providers to offer transmission of voice, LAN and data to small and medium sized businesses over a single access line.

LA 140 IAD

LA-140 modules provide maximum flexibility for service integration, ease of use and scalability. They allow migration from E1/T1 to xDSL transmission modes without replacing the unit.

The LA-140 performs circuit emulation using AAL1 to support voice interfaces. This facilitates the connection of PBXs or other channeled E1/T1 devices. LA-140 supports FXS and ISDN over AAL2 in accordance with the ATMF LES standard for transport of different voice channels on the same Virtual Channel (VC).

Equipment	Order Number
LA-140 CHASSIS	LA140/AC
Chassis with Echo Cancellation	LA140/AC/EC
T1 + Serial Module	LA140M/T1/V35
E1 + Serial Module	LA140M/E1/V35
QUAD ISDN NT Module	LA140M/ISDN-NT
QUAD ISDN TE Module	LA140M/ISDN-TE
SHDSL Module	LA140M/SHDSL
ADSL Annex A Module	LA-140M/ADSLA
ADSL Annex B Module	LA-140M/ADSLB

LA-104 High Speed IAD

LA-104 is an ATM IAD (Integrated Access Device) that enables service providers to offer LAN services over up to four access lines to small and medium sized businesses.

LA 104

LA-110 Dedicated ATM IAD

LA-110 is an ATM IAD that enables service providers to offer voice, LAN and data over a single access line to small and medium sized businesses. The system offers selectable, optional user ports. E1, 4 FXS or 4 ISDN S0

Voice and data are statistically multiplexed into an ADSL or SHDSL WAN link.

LA 110

T1/E1 Modular Integrated Access Device

The P32mxi is a modular 32-channel voice/data Broadband Access Device which can be deployed in today's existing networks, while offering inexpensive upgrades for future networks. Small (7.7" L x 13" W x 1.75" H) and lightweight (5.4 lbs), the system was specifically designed for customer premise operation. The system supports dual T1/E1 ports, 32 analog FXS/FXO/DPT/DPO ports, SNMP management, Windows TM -based Graphical User Interface, a full-featured TCP/IP router with an embedded stateful firewall, 10/100 Base-T Ethernet port, MGCP Voice over IP support, with simultaneous operation of TDM, ATM and IP. The system also includes an integrated V.35 interface, true sine-wave ringing generator, and built-in battery charger with programmable maintenance cycles. A wall or rack-mountable battery backup system providing up to 8 hours of backup power is also available.

P32mxi

Equipment	Order Number
P32mxi, 24FXO	PKG-T1-24FXO
P32mxi, 24FXS	PKG-T1-24FXS
P32mxi, 30FXO	PKG-E1-30FXO
P32mxi, 30FXS	PKG-E1-30FXS
FXO Answer Supervision	MX420
Router Module	MX540
MODEM Adapter	3500004-001

RAD data communications

DXC Access Concentrators

The DXC family of modular Multiservice Access Nodes provides non-blocking cross connection for up to 960 DS0s and up to 120 fractional E1/T1 ports. DXC supports built-in local loop solutions. Plug-in interface modules supporting n x 56/64 kbps, E1, T1, E3 or T3 transmission over copper, fiber or HDSL are available. Also available is the DIM module which provides inverse multiplexing capabilities of up to 8 x E1, 8 x T1.

DXC Family

DXC-30 supports up to 120 E1, T1 or up to 30 n x 56/64 kbps ports. DXC-10A supports up to 40 ports, while the smaller DXC-8R supports up to 32 ports. A user-programmable connection table connects any incoming 64 kbps timeslot to any outgoing 64 kbps timeslot. Support is provided for drop & insert and broadcast. Cross-connection of n x 56 kbps or n x 64 kbps channels is implemented by placing the data onto an E1 or T1 frame, using only the required number of timeslots. This provides Fractional CSU/DSU functionality. 1:1 protection through dual cable at the port level (same module) ensures less than 50 msec link redundancy. Y-cable redundancy between modules protects the service from hardware failure. Channel relocating and half duplex conferencing are also supported.

Setup, control and diagnostics can be performed out-of-band via a V.24 supervisory port or optional Ethernet management port using an ASCII terminal with SLIP or PPP protocols. A built-in SNMP agent enables remote management for configuration and diagnostics of remote devices (up to 30 remote locations) using TS 0, a dedicated timeslot of E1/T1 trunk or Telnet.

MODULES

DT1, the two-port T1 interface module, complies with AT&T TR-62411 and ANSI T1.403 requirements and supports both D4 or ESF framing formats and AMI line code (zero suppression is selectable for either Transparent, B7ZS or B8ZS). For long range applications, a CSU option is available. DT1B version with BERT and loopback per timeslot is also available

DE1, the two-port E1 interface module, complies with ITU-T Rec. G.703, G.704, G.732, G.736 and G.823, and supports both 2 and 16 frames per multiframe (256 N and 256 S respectively), TS 0 multiframe with CRC-4 and HDB3 line code. For long range applications, an LTU option is available. DE1B version with BERT and loopback per timeslot is also available.

DT3, the single-port T3 interface module, supports multiplexing of up to 28 T1 channels into a T3 frame with C-bit parity per ANSI T1.404 or M13 framing options. DT3 is available with either coax or fiber interfaces.

DHS, the two-port n x 56/64 kbps data module, provides two high speed synchronous data channels. Each channel is independently selected for either V.35 or RS-422/V.11 interface. Each channel can support bit rates of n x 56 kbps or n x 64 kbps, where: n = 1 to 24 for T1, n = 1 to 31 for E1.

DFO, the two-port Fiber Optic Link module, enables the DXC to connect directly to a fiber optic network, eliminating the need for an external fiber optic modem or repeater. DFO operates with different grades and sizes of single/multimode fiber optic cable and is available with LED and laser diode optical interfaces.

Equipment	Order Number
DXC-30E	RDXC30E
DXC-30 115/230v	RDXC30
DXC-10A-1/115v	RDXC10A
DXC-10A-1/230v	RDXC10A230
DXC-8R/48vdc	RDXC8R48v
DXC Dual T1 Module	RDXCMT1
DXC Dual T1 Module with CSU	RDXCMT1c
DXC Dual E1 Module	RDXCME1
DXC Dual E1 Module with LTU	RDXCME1c
DXC 4xT1 Module	RDXCMD4T1
DXC 8xT1 Module	RDXCMD8T1
DXC 4xE1 Module	RDXCMD4E1
DXC 8xE1 Module	RDXCMD8E1
DXC T3 Module	RDXCMT3
DXC E3 Module	RDXCME3
DXC Dual V.35/RS530 Module	RDXCMHS
DXC Dual Fiber Module	RDXCDFO
DXC Inverse MUX V.35 Module	RDXCDIMV35
DXC Inverse MUX Ethernet	RDXCDIMETH
DXC 2-Port E1 HDSL	RDXCMDHLE
DXC 2-Port E1 HDSL 2W	RDXCMDHLE2
DXC 2-Port T1 HDSL	RDXCMDHLT1
DXC-2/115v (Fixed 2 Port)E1/T1	RDXC2T1E1

Call Pulse for more options and configurations.

MODULES

DIM, the Digital Inverse Multiplexer module, working in conjunction with DE1, DE1B, DT1, DT1B, DE3, DT3, D8E1 or D8T1 interface modules, enables DXC to function as an inverse multiplexer. DIM allows transmission of high speed signals over up to eight E1/T1 lines. This is achieved by breaking down the high speed signals over the multiple E1/T1 lines and routing these signals over different paths or facilities, while ensuring transmission integrity. The DIM is available with both serial and Ethernet interfaces.

DHL/E1, the two-port HDSL module, uses HDSL technology to extend the range of the DXC up to 4.0 km (2.5 miles) over 24 AWG (0.5 mm), 4-wire copper cable. It works opposite other RAD products with HDSL technology (such as HCD-E1, HTU - E1, HTU - E1L, HTU - 2 and Megaplex - 2100 with ML-H modules). DHL/E1 complies with ITU-T G.704 and ETSI ETR-152 standards.

DHL/E1/2W, the two-port HDSL module, uses HDSL technology to extend the range of the DXC up to 3.0 km (1.9 miles) over 24 AWG (0.5 mm), 2-wire copper cable. It can work in conjunction with the HCD-E1/2W to extend the range of the traditional subscriber loop while saving on the copper infrastructure. DHL/E1/2W complies with ITU-T G.704 and ETSI ETR-152 standards.

DE3, the single-port E3 interface module, supports multiplexing of up to 16 E1 channels into an E3 frame per ITU-T G.751. DE3 is available with either coax or fiber interfaces.

DHL/T1, the two-port HDSL module, uses HDSL technology to extend the range of the DXC up to 4.0 km (2.5 miles) over 24 AWG (0.5 mm), 4-wire copper cable. It works opposite other RAD products with HDSL technology (such as HTU - T1, HTU - T1L and Megaplex - 2100/2200 with MLH and HSH modules). DHL/T1 complies with ITU-T G.704 and ANSI T1E1.4.

D4E1/D8E1, the four or eight-port E1 interface module, provides 4 or 8 E1 links over copper cable supporting E1 or Fractional E1 rates

D4T1/D8T1, the four-port or eight-port T1 interface module, provides 4 or 8 T1 links over copper cable supporting T1 or Fractional T1 rates.

D8U/D16U, the 8 or 16-port ISDN "U" interface module, provides independent ISDN "U" ports, each supporting 2B + D channels, for total payload data rate up to 128 kbps per port. D8U/D16U can be configured either to extend ISDN lines over non-ISDN facilities (/I mode) or as dedicated line termination unit for the ASM - 31 or ASMi - 31 short-range modems.

DXC 100 Modular Multiservice Access Node

The modular, 6U high DXC-100 device is the latest addition to the DXC family of multiservice access nodes. Each chassis supports up to 80 n x 56/64 kbps, 88 E1/T1, eleven E3/T3, or four STM-1/OC-3 links. Up to eight chassis can be stacked to support up to 640 n x 56/64 kbps, 688 E1/T1, 80 E3/T3 or 32 STM-1/OC-3 lines, for a powerful, central site solution. The scalable platform enables carriers to deploy a system with low entry cost to meet their current requirements, and add additional chassis and modules as their customer base grows.

The basic DXC-100 chassis is 10.5” (6U) high, and NEBS Level 3 certified. The chassis includes eleven I/O slots for the plug-in interface module sets. Each module set consists of a front main module and a rear interface module. The power supply and system manager modules are not provided with the chassis and must be ordered separately. Optional redundancy for the system manager and power supply modules are available.

ADTRAN

ATLAS 830 and 890 Series

The ATLAS™ 830/890 Integrated Access Device (IAD) is a multi-function, modular platform that provides voice, data, video, and Internet connectivity and WAN access to reduce overall telecommunication expenses. The ATLAS 830/890 is designed to be installed between the network service provider's circuit(s) and customer premises equipment enabling many network devices to share WAN access and bandwidth. This flexible and modular platform functions as a T1/T3/E1 bandwidth manager, ISDN PRI/BRI switch, Frame Relay switch, IP Router, NxT1 IMUX, and 3/1/0 DACS. It also includes intelligent call routing through the integral switchboard and dial plan that provides dynamic call-by-call switching based upon the called or calling phone number.

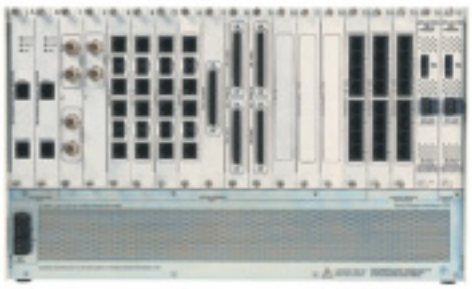
The ATLAS 830 is an eight slot, modular platform that supports up to 34 T1/PRIs or 32 E1s and offers a series of hot-swappable option modules, allowing the system to satisfy many applications in corporate networks. The ATLAS 890 chassis is also available supporting up to 64 T1/E1 ports. The ATLAS provides DACSing and grooming for T3 and T1 circuits in a small and economical footprint. Users can perform time slot interchange and reassign or cross-connect any DS0 from any circuit to any other circuit. The ATLAS also provides dynamic circuit switching on the high speed backplane. ISDN and voice switching are performed on a call-by-call basis for on-premises routing or least cost routing to the public network.

The ATLAS supports video applications by providing multiple T1, PRI, BRI, V.35, RS-449, EIA-530 and RS-366 interfaces for codecs and gateways. By using the Nx56/64 BONDing module, video calls ranging from 112Kbps up to a full PRI rate (1.472 Kbps) can be supported. For data applications, users can connect the ATLAS 830 directly to the LAN using the integral 10/100BaseT Ethernet interface and internal IP routing software. Users can also connect an external router or other device through one or more serial ports. ATLAS 830 offers a variety of serial interface options, including V.35, EIA-232, EIA-530, RS-449, X.21, and V.36. The ATLAS includes Frame Relay software as well as an IP router and support for PPP applications.

Voice over Frame Relay (VoFR) is supported using one or more of the optional Voice Compression Modules to deliver high quality voice among Frame Relay sites. The ATLAS can be configured to transport voice and data traffic within a single PVC, reducing monthly expenses. ATLAS supports IP routing over public and private Frame Relay networks. For network management, the ATLAS supports N-Form and offers local and remote management capabilities using Telnet or VT100 connected to the built-in 10/100BaseT Ethernet interface.

ATLAS 830 rear

ATLAS 830



ATLAS 890

Equipment	Order Number
ATLAS 830 AC Power	ADTN1200780L1
ATLAS 830 DC Power	ADTN1200781L1
ATLAS 890, AC Non-Redundant	ADTN4200321L1
ATLAS 890, AC Redundant	ADTN4200321L2
ATLAS 890, DC Non-Redundant	ADTN4200321L3
ATLAS 890, DC Redundant	ADTN4200321L4
ATLAS 890 System Controller	ADTN1200322L1
ATLAS 890 AC Power Supply	ADTN1200344L1
ATLAS 890 DC Power Supply	ADTN1200345L1
NxT1 HSSI/V.35 Module	ADTN1200771L1
QUAD T1/PRI Module	ADTN1200185L3
QUAD E1/PRI Module	ADTN1200264L1
QUAD Nx56/64 Module / V.35	ADTN1200184L1
QUAD USSI Module/ RS-449/V.36	ADTN4200261L1
QUAD USSI Module/ RS-530	ADTN4200261L2
QUAD USSI Module/ X.21/V.11	ADTN4200261L3
QUAD USSI Module/ RS-232	ADTN4200261L4
OCTAL Basic Rate ISDN	ADTN1200186L2
Modem-16 Module / V.90	ADTN1200181L1
Async-232 Module	ADTN1200182L1
HDLC Module	ADTN1200222L1
Voice Compression / 8 Port	ADTN1200221L1
Voice Compression / 16 Port	ADTN1200221L2
Voice Compression / 24 Port	ADTN1200221L3
Voice Compression / 32 Port	ADTN1200221L4
IMUX 56/64 Module	ADTN1200262L1
T3 Module	ADTN1200223L1
T3 Module with D&I	ADTN1200225L1
Dual V.35 Video Module	ADTN4200773l1
Dual EIA-530 Video Module	ADTN4200773L2
Dual RS-449 Video Module	ADTN4200773L3

ATLAS 550 Integrated Access Device

The ATLAS 550 is an Integrated Access Device designed to improve and lower the costs of Voice/Data, video, and Internet communications for both enterprise businesses and network service providers. With the ATLAS 550, many WAN functions have now been merged and combined into a small, economical, modular platform that will replace a rack of traditional single function access devices. Traditional multiplexed and packet networks are easier to deploy and manage while providing more bandwidth efficiency out of existing or new communications links. The ATLAS 550 provides a new level of communications flexibility by offering many of the features previously found in larger central office, PBX, or router equipment.

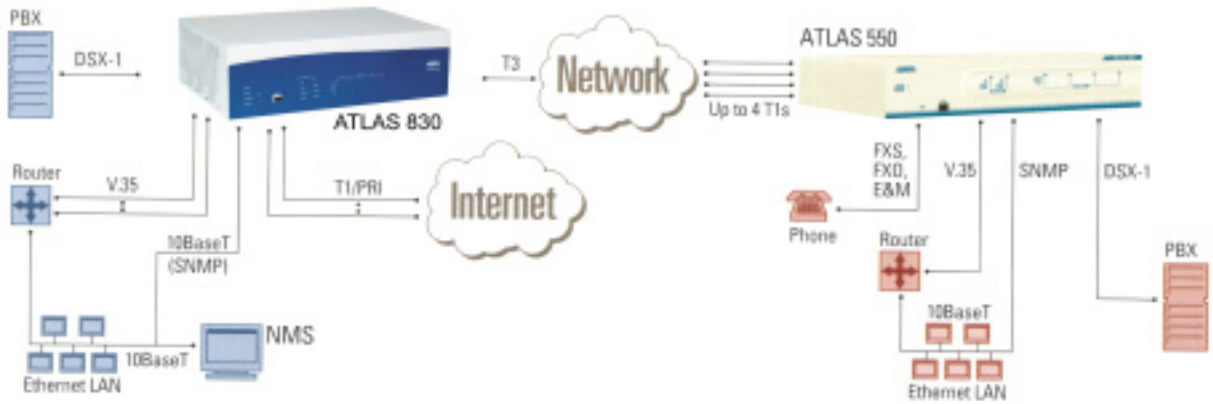
The ATLAS 550 chassis includes a high speed multi-protocol backplane and six modular expansion slots, two network interface slots and four user interfaces slots. A wide range of hot swappable, industry standard modules are also available to effectively converge your telecommunications and your existing network systems such as routers, PBX, key systems, video conferencing equipment, remote access servers, LANS, faxes, and telephones. The ATLAS 550 will typically reside at a customer site and perform the functions found in multi-port multiplexers, channel banks, 1/0 cross connect switches, Frame Relay access devices/concentrators/switches, IP routers, and ISDN switches. It also includes an integral voice switchboard and dial plan for dynamically and intelligently switching voice and data calls based on the telephone number dialed.

- Supports TDM or packet networks
- Supports FXS, FXO, and DSX-1 for PBX or key systems
- Supports up to 32 analog ports
- Management via: SNMP, Telnet, and VT100
- Integral 10/100BaseT Ethernet for routing and management
- Hot swappable modules
- Integral FR software for access, concentration, and switching

ATLAS 550

Equipment	Order Number
ATLAS 550 AC Power	ADTN1200305L2
T1/PRI Network Interface Module	ADTN1200307L2
E1/PRA Network Interface Module	ADTN1200308L1
Dual T1/PRI Interface Module	ADTN1200314L2
Quad T1/PRI Interface Module	ADTN1200755L2
Octal FXS Module	ADTN1200309L1
QUAD FXS Module	ADTN1200328L1
Octal FXO Module	ADTN1200310L1
QUAD FXO Module	ADTN1200329L1
Octal E&M Module	ADTN1200313L1
Dual Nx56/64 V.35 Module	ADTN1200311L1
QUAD BRI Module	ADTN1200315L1
4ch Voice Compression Module	ADTN1200312L5
8ch Voice Compression Module	ADTN1200312L1
16ch Voice Compression Module	ADTN1200312L2
24ch Voice Compression Module	ADTN1200312L3
IMUX Module	ADTN1200326L1
Resource Host Module	ADTN1200324L1
BRI Dial Backup Module	ADTN1200327L1
32 Channel ADPCM Module	ADTN1200752L1
Ethernet Switch Module	ADTN1200766L1
Dual RS-530 Serial Module	ADTN4200754L2
Application Bundles	
ATLAS 550 T1 to PRI Converter	ADTN4200305L1
ATLAS 550 Video Switch	ADTN4200305L2

(Application bundles are pre-configured for specific applications, contact Pulse for more ordering options and possible configurations)



ADTRAN

Total Access® 1500

Total Access® 1500 is a Carrier Class, multiservice access platform for deploying narrowband services from TDM network access. A compact, extremely versatile platform, Total Access 1500 integrates the functionality of many carrier products into a single high density chassis. Total Access 1500's small footprint (2U-high mounting) makes it the perfect choice for integrated communications providers such as ILECs, CLECs, and ISPs who need to deploy services from crowded Remote Terminals (RTs), Central Offices (COs), or Co-Location (COLO) facilities.

Total Access 1500 provides a variety of services including POTS, special services (ISDN, DDS, FXO, FXS, E&M, DPO, DPT, and PLAR), and data services. Total Access 1500 complements ADTRAN's Total Access 3000 broad-band multiservice access platform, which can terminate and distribute higher bandwidth services such as SONET, DS3, HDSL, HDSL2, T1, and Optical DS2. Total Access 1500 can be deployed as a:

- Small Digital Loop Carrier (DLC), for a simple and effective means of deploying POTS (up to 96 lines in a 2U mounting)
- Special services delivery platform, with up to five times the density of any competing platform (D4)
- IAD, serving up to 96 customers with voice and data services

Total Access 1500 is a modular device with five common slots and 24 access slots. Common units required for operation are a Power supply Unit (PSU), Line Interface Unit (LIU), and System Controller Unit (SCU). A second, redundant PSU and LIU may be deployed for added reliability. The PSU is available with an integrated Ring Generator providing up to 40 REN ringing capacity. The LIU can support up to four T1 interfaces and has full Time Slot Assignment (TSA) capability. This feature allows users to "steer" varied amounts of bandwidth from the network to any of the access slots, ensuring that no bandwidth is stranded. The 24 access slots accept a variety of voice and data access modules, allowing users to optimize their service for each application.

Using local or remote inband management, service providers can provision and monitor the bank's network interface and access modules. Transaction Language 1 (TL1) protocol is used to communicate with Telcordia's NMA™ Operations Support System (OSS) using an internal X.25 PAD. An Ethernet 10BASET connector is used for connection to SNMP networks and Telnet. ADTRAN's ADVISION™ software, run on a Hewlett-Packard Openview workstation, provides a graphical user interface (GUI). Total Access 1500 is designed for 23" relay racks. Full compliance with NEBS Level 3 and UL 1950 ensures maximum reliability and safety.

Total Access 1500

Equipment	Order Number
Chassis and Commons	
Total Access 1500 Chassis	ADTN1180001L1
PSU	ADTN1180007L2
PSU/RG	ADTN1180007L1
LIU 4T1+Protect	ADTN1180109L1
LIU 2T1	ADTN1180009L1
Universal SCU	ADTN1180008L1
SCU COT w/MLT	ADTN1180008L2
SCU RT w/MLT	ADTN1180008L3
Single Access Modules	
Single E&M/TO	ADTN1180402L1
Single FXS/DPO/PLAR	ADTN1180403L1
Single FXO/DPT	ADTN1180404L1
Single OCU DP	ADTN1180005L1
Single DSO DP	ADTN1180003L1
Single U-BR1TE	ADTN1180020L1
Single Total Reach DDS DP	ADTN1180105L1
Single FT1 DP	ADTN1180405L1
Dual Access Modules	
Dual DSO DP	ADTN1180203L2
Dual OCU DP	ADTN1180205L2
Dual FXS/DPO/PLAR	ADTN1180208L2
Dual FXO/DPT	ADTN1180207L2
Dual V.35	ADTN1180025L1
Quad Access Modules	
Quad FXO/C-POTS	ADTN1175407L2
Quad FXS/R-POTS w/MLT	ADTN1180408L1
Accessories	
AC Power Converter/Charger	ADTN1180043L1
Battery Backup System	ADTN1175044L1
Wall Mount Brackets	ADTN1180048L1

ADTRAN

T1 Multiplexers with room to grow !

TSU 600e

TSU 120e

TSU Series of Modular T1 Multiplexers

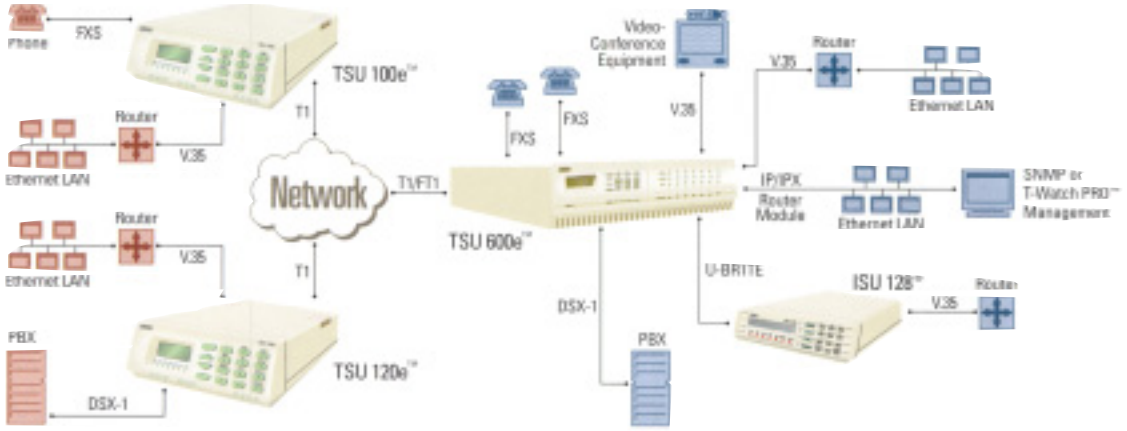
The TSU is a series of T1-FT1 DSU/CSUs with one or six expansion slots for multiple end-user application support. The ESU 120 is an E1 version of the TSU 120e.The expansion slots allow the TSU to support up to 24 ports and provide the greatest amount of capacity for T1 multiplexing applications. All expansion slots can be populated by the end-user with different modules to provide a truly flexible T1 interface solution. Many option modules provide hot-swap capability and can be replaced without having to power down the base unit. The optional expansion modules support additional Nx56/64 ports, analog voice circuits, DSX-1, T1 Drop & Insert, OCU DP, V.34 modem and several others. The amount of bandwidth allocated to each port is user-programmable from the front panel, through a VT100 terminal, from T-Watch PRO or Telnet. Two DS0 configuration maps can be stored with provisions to switch between them at predetermined times. The “e” version of the TSU supports monitoring and control with embedded SNMP provided through both a SLIP and a 10BaseT Ethernet interface. In the event of failure conditions or other alarms, the TSUe supports SNMP traps and alarms to the host workstation and, if required, dial-out to a pager. For critical applications, the TSU600e supports internal redundant powering with an optional secondary power supply.

The TSU 600 is designed for stand-alone, rack-mount, or wall-mount installation with an optional wall-mount assembly and has six user module expansion slots. The TSU 100 and TSU 120 are standalone versions with a single expansion slot. The TSU 100 and 120 have a built in V.35 serial port. The TSU 120 has an additional DSX-1 PBX interface. A rack mount shelf is available for mounting in a standard 19” rack.

A keypad and LCD on the front panel of the TSU multiplexers enables the user to configure, monitor, and test the unit manually by using an easy-to-follow menu structure. The expansion slots on the rear of the unit each accept a single expansion module. The expansion modules can be combined with plug-on modules to increase the versatility of the T1-FT1 network. Several application-specific expansion modules are available, providing flexibility and room for growth.

Equipment	**Order Number**
TSU 600 Chassis 115v	ADTN1202076L2
TSU 600e Chassis 115v w/SNMP	ADTN1202076L1
Redundant AC Power Module	ADTN1200216L1
TSU 600 Chassis -48vdc	ADTN1202076L2#DC
TSU 600e Chassis -48v	ADTN1202076L1#DC
TSU 100	ADTN1202052L2
TSU 100e	ADTD1202052L1
TSU 120	ADTN1202129L2
TSU120e	ADTN1202129L1
ESU120e	ADTN1200420L1
Modules	
Netvanta Router Module	ADTN1202350L1
DSX-1 Module for PBX Link	ADTN1200055L1#HS
T1 Drop & Insert Module	ADTN1200065L1
Dual Nx56/64 Data Module	ADTN1200142L1#HS
NxIQ Nx56/64 Frame Relay Aware	ADTN1200255L1
Dual OCU DP Module	ADTN1200230L1#HS
Multiport DBU Module	ADTN1200089L2#HS
Dual U-Brite ISDN Module	ADTN1200107L1#HS
Dual FXS Voice Module	ADTN1200080L1#HS
Dual FXO Voice Module	ADTN1200103L2
Dual E&M Voice Module	ADTN1200105L2

Call Pulse for more ordering options on this product.



T1/E1 Multiplexers

RAD data communications

Megaplex 2200

Megaplex 2200 is a flexible modular TDM integrating access node supporting up to 120 n x 64 kbps channels. PSTN, ISDN and data services are supported either directly or via built-in IDSL modems compatible with RAD's ASMi - 31. Megaplex - 2200 enables integration of multiple dedicated, voice, ISDN, video and LAN channels onto **four E1/T1 links**. The built-in cross-connect matrix enables Megaplex 2200 to split the voice and data channels and redirect the traffic to separate trunks. Each trunk can then be connected directly to the appropriate service, maximizing efficiency. The modular Megaplex - 2200 is especially suitable for use as an economical compact access node. It is ideal for serving small communities providing mixed services for both business and residential customers. Megaplex - 2200 can be deployed both at the exchange, at the point-of-presence or at the remote distribution node location.

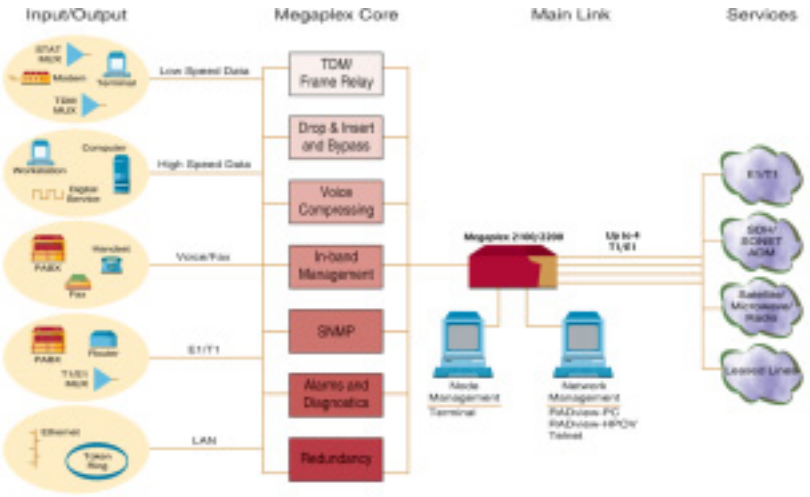
Megaplex 2100

Megaplex 2200

Megaplex 2100/2104

Megaplex - 2100 is a flexible TDM Integrating Access Device (IAD), enabling the integration of multiple dedicated data, Frame Relay, voice, ISDN, video and LAN channels onto E1/T1 main links. To support Frame Relay together with TDM technology, a special Megaplex - 2100H version with a hybrid common logic is available. Megaplex - 2100 enables carriers to successfully deploy bundled services, ISDN services and Internet access. The integration of a broad range of services makes Megaplex - 2100 a cost-effective IAD with reduced deployment and maintenance costs.

- Megaplex 2104 - 4 I/O Module Slots
- Megaplex 2100 - 11 I/O Module Slots
- Megaplex 2100/2200 - Up to 4 E1/T1 Links
- Fiber, Ethernet and Copper Main Links Available
- Management via: SNMP, Telnet, and VT100
- Integral 10BaseT Port for Management
- HDSL Main Link and User Interfaces Available
- Frame Relay Support in Hybrid Megaplex 2100



Equipment	Order Number
Megaplex 2104 T1	MP2104TC115
Megaplex 2104 E1	MP2104E115
Megaplex 2100 T1	MP2100TC115
Megaplex 2100 E1	MP2100E115
Megaplex 2200	MP2200B115
Megaplex 2200 I/O Modules	
QUAD T1 Main Link	MP2200MML4T1
QUAD E1 Main Link	MP2200MML4E1
6 Port High Speed Data Module	MP2200MHS6
12 Port High Speed Data Module	MP2200MHS12
12 Port Low Speed Data Module	MP2200MLS12
4 Port HDSL Module	MP2200MHSH4
12 Port ISDN BRI Module	MP2200MHSU12
12 CH PCM Voice Module	MP2200MVC12
6 CH PCM Voice Module	MP2200MVC6
Megaplex 2100/2104 I/O Modules	
12 Port Sync/Async Data Module	MP2100MLS12
6 Port Sync/Async Data Module	MP2100MLS6
4 Port V.110 RS-232 Data Module	MP2100MHSR
2 Port High Speed Data Module	MP2100MHS2
3 Port High Speed Data Module	MP2100MHS3
4 Port High Speed Data Module	MP2100MHSQ
E1/T1 Sub Channel Module	MP2100MHS4
4 Port ISDN S Interface Module	MP2100MHSS
4 Port Analog Voice	MP2100MVC2
6 Port Analog Voice	MP2100MVC6
6 CH MPMLQ Compressed Voice	MP2100MVFPBX
Ethernet IP/IPX Router Module	MP2100MMBE
Token Ring Bridge Module	MP2100MTRE

Call or email Pulse for more information and ordering details.

ADTRAN

10 Year Warranty!

Total Access 750

As competition for dial tone heightens, service providers must find integrated access devices that allow cost effective deployment of voice and data services at the customer's premises. ADTRAN answers this call with the Total Access 750 (TA 750) product line. The TA 750, a low-cost integrated access device, allows service providers a means to offer combined voice and data traffic over a single T1 terminating at a customer's premises. The TA 750 supports a broad service offering including analog voice (FXO/FXS), NxData, Fractional T1, ISDN and DDS.

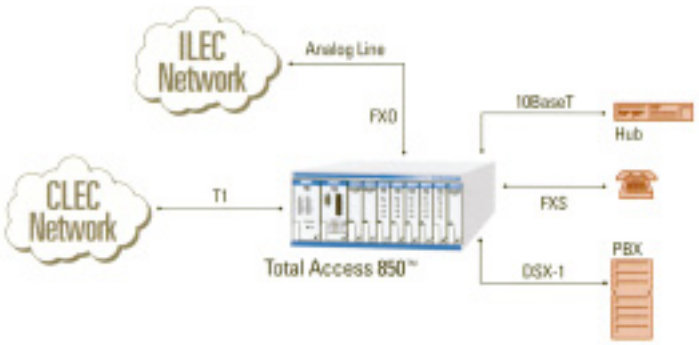
TA 750/850

The 2U design of the TA 750 and 850 uses a minimum amount of wall space. The 8.5-inch x 11-inch chassis uses a space about the size of a standard piece of notebook paper. When rack mounting is desired, two TA 750 systems can be mounted side-by-side in either a 19-inch or 23-inch rack.

Total Access 850

The Total Access 850 system is an integrated access device designed for cost effective deployment of voice and data services at the customer's premises. The Total Access 850 system benefits integrated communications providers, such as CLECs, ILECs and ISPs, who require a customer premises device that integrates voice and data functions, and provides a viable migration path from TDM to packet-based technology. The Total Access 850 features remote management, an integrated IP/IPX router and special services slots.

The Total Access 850 is a modular device, with two common slots and eight access slots. Common cards required for operation are a power supply unit (PSU) and a router control unit (RCU). The RCU is a card that currently supports TDM-based applications, but can be easily upgraded to an ATM-based controller as requirements migrate. The RCU includes a T1 network interface, Nx56/64 V.35 interface and built-in IP/IPX router. Six access slots allow the user to combine a variety of voice and data services. Up to six Quad FXS or Quad FXO access modules can be installed to support up to 24 analog voice lines. Other access modules for data applications include the OCU DP and ISDN U-BR1TE. The other two access slots are for future hardware options.



Equipment	Order Number
TA 750 Chassis	ADTN1175001L1
TA 750 Dual Chassis	ADTN1175201L1
TA 750 BCU	ADTN1175012L1
TA 750 BCU w/FT1	ADTN1175012L2
TA 750 Nx56/64 DSU DP Card	ADTN1175025L1
TA 750/850 PSU	ADTN1175006L1
TA 750/850 Quad FXO Card	ADTN1175407L2
TA 750/850 Quad FXS Card	ADTN1175408L2
TA 750/850 Single E&M/TO	ADTN1180402L1
TA 750/850 Single DSO DP	ADTN1180003L1
TA 750/850 Single OCU DP Card	ADTN1180005L1
TA 750/850 Single UBRITE	ADTN1180020L1
TA 750 DC Chassis Bundle	ADTN4175001L1
TA 750 AC Chassis Bundle	ADTN4175001L1AC
TA 750 DC + 12 FXS Bundle	ADTN4175001L3
TA 750 AC + 12 FXS Bundle	ADTN4175001L3AC
TA 750 DC + 24 FXS Bundle	ADTN4175001L6
TA 750 AC + 24 FXS Bundle	ADTN4175001L6AC
Dual TA 750 Chassis DC Bundle	ADTN4175201L1
AC Supply & Battery Charger	ADTN1175043L2
Battery Back-Up System	ADTN1175044L1
TA 850 Chassis	ADTN1200375L1
TA 850 Dual Chassis	ADTN1200375L2
TA 850 T1 RCU	ADTN1200376L1
TA 850 BCU L1	ADTN1200373L1
TA 850 BCU L2	ADTN1200373L2
TA 850 Nx56/64 Module	ADTN1200372L1
TA 850 DC Chassis Bundle	ADTN4200376L1
TA 850 AC Chassis Bundle	ADTN4203376L1AC
TA 850 DC Chassis w/12 FXS	ADTN4203376L2
TA 850 AC Chassis w/12 FXS	ADTN4203376L2AC
TA 850 DC Chassis w/16 FXS	ADTN4203376L3
TA 850 AC Chassis w/16 FXS	ADTN4203376L3AC
TA 850 AC Chassis w/24 FXS	ADTN4203376L2AC

T3/E3 Multiplexers

ATLAS 830 T3 Bandwidth Manager

M13 Mux with DACS !

ATLAS 830 is a modular and scalable integrated access device for end users and network service providers. With the T3 module, the ATLAS 830 can be configured to accept a T3 circuit and then groom the channels to other T1 lines or user equipment.

ATLAS 830

(see pages 5&6 for other Atlas products)

Network service providers may groom several T1s into a T3 circuit, and ATLAS provides all the internal CSUs and management software to make it cost effective.

In large-scale networks, a network manager may be able to reduce the monthly expenses of T1 circuits by upgrading to T3. Usually it becomes more cost effective and saves money to implement a T3 network after reaching eight or 10 T1 lines.

The ATLAS 830 T3 Module operates as a T3 bandwidth manager, a "3/1/0 DACS", an **M13 Multiplexer**, and a DS0 level DACS - all in a single, economical platform.

Equipment	Order Number
ATLAS 830 AC	ADTN1200780L1
ATLAS 830 DC	ADTN1200781L1
T3 Module	ADTN1200223L1
T3 Module with D&I	ADTN1200225L1
Quad T1/PRI Module	ADTN1200185L3
Quad Nx56/64 Module / V.35	ADTN1200184L1

MX2800 M13 Multiplexer

The Adtran MX2800 offers bandwidth consolidation at a low price and in the smallest footprint available in the industry. Measuring only one rack unit high in 19-inch or 23-inch rackmount configurations, this compact device gives NSPs and enterprise users a powerful tool for consolidating 28 T1 signals or 21 E1 signals into a T3 or STS-1 circuit. The MX2800 is NEBS Level 3 compliant and comes with a standard 10 Year warranty.

MX2800

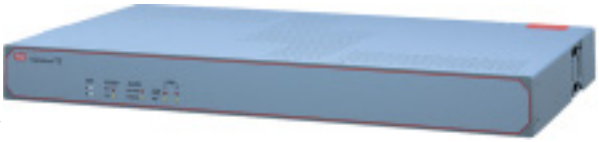
Equipment	Order Number
MX2800 AC Redundant	ADTN4202290L6
MX2800 DC Redundnat	ADTN4202290L8
MX2800 AC	ADTN4202290L5
MX2800 DC	ADTN4202290L7

The MX2800 is also available with a built in modem for diagnostics. Call Pulse for details

Optimux-T3

Optimux-T3 is a manageable multiplexer that provides a highly cost effective and simple solution for transporting multiple E1 and T1 links, as well as a combination of E1 and T1 (G.747) over a single T3. The Optimux T3 is available with either 28 Balanced T1/E1 connectors or 21 unbalanced BNC connector for E1 applications. The T3 connector is available with standard COAX or fiber (both singlemode and multimode).

Redundant power and secondary T3 link are available. The secondary T3 link provides backup using automatic switchover upon main link failure.



Optimux T3

Optimux XLE1 16

Optimux-XLE1

Optimux XL is an E3-based copper or fiber multiplexer. It provides standard E3 to 16xE1 multiplexing over a variety of interfaces, including, single mode fiber, multimode fiber and coax electrical E1. 16 E1 interfaces are available in either balanced or unbalanced connectors. Redundant power and link options are also available.

Equipment	Order Number
Optimux-T3 AC, COAX T3	OPT3ACCX
Optimux-T3 DC, COAX T3	OPT3DCCX
Optimux-E3, 16 E1 Balanced	OPXLE1/16B

For a full listing of ordering options, contact your nearest Pulse office.

Subrate Multiplexers

**** NEW ****
TCP/IP Ethernet Main Link Module
Now Available!!
See Page 13 for details.

Kilomux-2100/2104

Kilomux-2100/2104 Sub-Rate Multiplexer

The Kilomux time division multiplexer provides an efficient and cost-effective solution for integrating data, voice, fax and LAN traffic over digital data services, leased lines, IP, ISDN and other services. Access to the various services is provided over a variety of standard interfaces at data rates ranging from 9.6 kbps to 1,536 kbps.

The modular construction of the Kilomux is ideally suited to implement system designs according to specific applications and to provide easy upgrading. The redundant power supply and link interface options increase system reliability. The low overhead, minimal end-to-end delay and allocated bandwidth of the Kilomux, together with voice compression, ensure quality of service while maximizing utilization of the available bandwidth.

Many interfaces are available on the aggregate link(s) for compatibility with digital data services worldwide. These include V.35, V.36, V.11 , RS-530, V.24/RS-232, X.21 and G.703 codirectional. Built-in CSU/DSU, Fractional E1/T1, fiber optic, ISDN terminal adapters and TDMoIP are also available. Soft-selectable timing options from either the link or any channel are standard for all interfaces, as is support for control signals. Standard 8-bit buffers on both the transmit and receive lines, as well as an optional on-board 256-bit satellite buffer, enable the use of any type of access media. These include leased lines, fiber, radio, microwave and satellite links.

MODULES

KML: Kilomux supports several different types of main link modules (KML) for compatibility with various digital data service interfaces and public services. Interfaces supported are V.35, V.24/RS-232, V.36/RS-449/RS-530, X.21, G.703, standard CSU/DSU for DDS services, Fractional E1/T1, ISDN Basic Access, fiber optic and TDM over IP.

KDI: is a system module which provides drop&insert functionality by bypassing any channel or combination of channels between link A and link B.

KHS: High speed sync data modules, operating at selectable data rates from 2.4 kbps up to 614.4 kbps. Interfaces supported include V.35, V.36/RS-449, X.21 and RS-530 as well as BRI ISDN.

KLS: Low speed sync/async modules and statistical multiplexing data modules, operating at rates from 0.3 kbps up to 64 kbps.

Voice/Fax KVC and KVF Modules

Support is provided for standard PCM and ADPCM or high quality compressed voice. Advanced speech coding techniques include MPMLQ, complying with ITU G.723, which offers a very high voice quality, at bit rates as low as 4.8 kbps. Voice/fax modules support automatic fax identification, enabling Group III fax transmission over 9.6 kbps of bandwidth. Both analog and digital voice interfaces are supported for connection to PBX tie lines, extensions or directly to telephones, as well as to E1/T1 trunk connections and ISDN PABXs.

KMBE/KTRE: Ethernet and Token Ring Internetworking modules for connecting between remote Ethernet and Token Ring LANs.

Equipment	Order Number
12 I/O Slot Chassis, V.35 AC	KM2100ACEUV35
12 I/O Slot Chassis, V.35 DC	KM2100DCEUV35
4 I/O Slot Chassis, V.35 AC	KM2104ACEUV35
4 I/O Slot Chassis, V.35 DC	KM2104DCEUV35
V.35 Main Link Module	KM2100MKML1
V.24/RS-232 Main Link Module	KM2100MKML2
V.36/RS-530 Main Link Module	KM2100MKML3
X.21 Main Link Module	KM2100MKML4
G.703 Main Link Module	KM2100MKML5
DDS CSU Main Link Module	KM2100MKML6
T1 Main Link Module	KM2100MKML7
E1 Main Link Module	KM2100MKML8
ISDN Main Link Module	KM2100MKML9
Fiber Main Link Module	KM2100MKML10
TDMoIP Main Link Module	KM2100MKML11
Drop/Insert Module	KM2100MKDI
2-CH Low Speed Sync/Async	KM2100MKLS1
2-CH High Speed Sync	KM2100MKHS1
2-CH ISDN Data Module	KM2100MKHSU
2-CH PCM/ADPCM FXS Voice	KMKVC1MFXS
2-CH PCM/ADPCM FXO Voice	KMKVC1MFXO
2-CH PCM/ADPCM E&M Voice	KMKVC1ME&M
4-CH Compressed Voice FXS	KMKVC4FXS
4-CH Compressed Voice FXO	KMKVC4FXO
4-CH Compressed Voice E&M	KMKVC4E&M
8-CH Compressed Voice FXS	KMKVC8FXS
8-CH Compressed Voice FXO	KMKVC8FXO
4-CH Digital Voice T1	KMKVC5T1
4-CH Digital Voice E1	KMKVC5E1
24-CH Digital Voice T1	KMKVC6T1
32-CH Digital Voice T1	KMKVC6E1

Call Pulse for more ordering options and configuration assistance.

Subrate Multiplexers

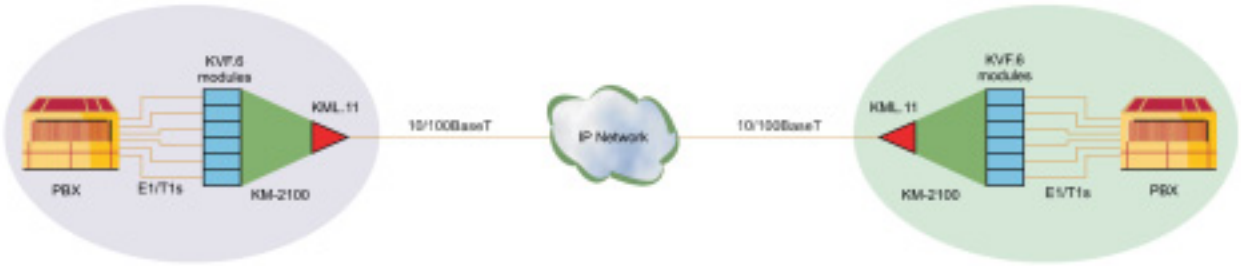
RAD data communications

Kilomux KML.11

The KML.11 main link module connects the Kilomux directly to an IP/Ethernet based backbone. KML.11 converts the TDM bit stream delivered over the internal Kilomux back plane into IP packets, effectively providing a cost-effective and versatile, modular TDMoIP (TDM over IP) solution for supporting popular TDM applications over emerging IP networks.

KML.11 is a standard IP device, supporting ICMP (ping), ARP, next hop and default gateway capabilities. ** See Page 12 for Kilomux System Ordering Options **

IP Main Link for Kilomux



DV-MUX3 Adaptive Multiplexer for Voice, Fax and Data

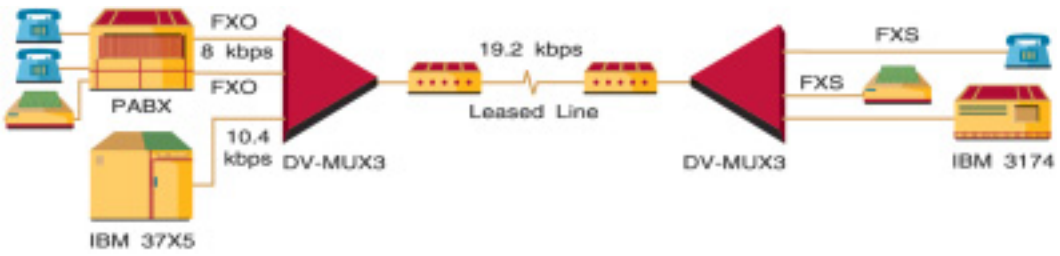
DV-MUX3 is an adaptive TDM Multiplexer, integrating one or two voice/fax channels together with one synchronous data channel onto a dial-up modem or digital link. The voice channels provide high quality voice compression using the MPMLQ voice digitizing algorithm at selectable rates of 4.8, 6.4, 7.2, 9.6 or 12.8 kbps. Toll quality voice reproduction (comparable to ADPCM at 32 kbps) is guaranteed when using rates of 6.4, 7.2, 9.6 or 12.8 kbps.

The synchronous data channel operates at rates up to 252.8 kbps. The actual rate depends on the data rate of the main link and on whether the operating mode is adaptive or non-adaptive. In the adaptive mode, the bandwidth is allocated to the voice and data channels dynamically with the data channel receiving additional bandwidth when the voice channel is "idle" (telephone on-hook). In the non-adaptive mode, each channel is allocated a fixed bandwidth.

DV-MUX3

Equipment	Order Number

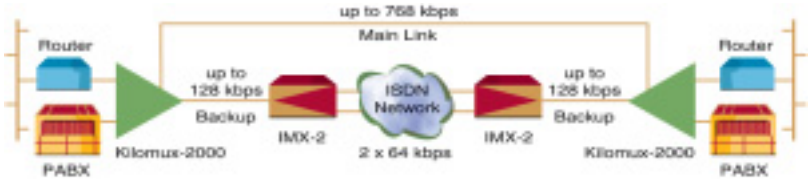
The DV-MUX3 is available with E&M (2/4 wire), FXO and FXS voice interfaces. Data and main link interfaces are available with V.35, V.24 (RS-232), RS-530 or X.21 interfaces. Please contact your nearest sales office for ordering assistance.



RAD data communications

IMX-2 Inverse Multiplexer

IMX-2 is an inverse multiplexer that splits a data channel between a leased line and an ISDN switched circuit connection depending on mode of operation, line availability and traffic load. Typical applications for the IMX-2 include high speed leased line backup, Dynamic Bandwidth Allocation and Bandwidth on Demand.

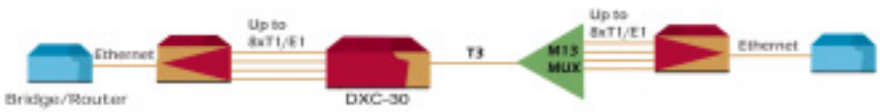


The **IMX-4T1/E1 Inverse Multiplexer** aggregates the bandwidth from up to four T1/E1 lines to create a logical channel from up to 5.888/7.680 Mbps. It bridges the bandwidth gap between T1/E1 and T3/E3 by providing increased bandwidth where services above T1/E1 are either not available or are too expensive to use. The high transmission rates are provided for applications such as router inter-networking. Two or four T1/E1 ports are available and can be ordered with or without CSUs. The IMX-4E1 has automatic rate fallback to lower speeds. If an T1/E1 line fails, the communication link remains open at a reduced speed. The IMX-4T1/E1 provides immediate connection upon installation. DTE interfaces are available for: V.35, V.36/RS-449, RS-530/RS-422, X.21 or HSSI. The data rate can be any multiple of 1.472/1.920 Mbps to a total of 5.888/7.680 Mbps.

The **IMXi-4 Inverse Multiplexer** is a user-friendly, easy-to-install, plug-and-play unit which splits and transmits a high-speed single data channel of up to 8.04 Mbps, over up to four E1/T1 or SHDSL links. IMXi-4 spans the bandwidth gap between E1/T1 and E3/T3 services, providing increased bandwidth where services higher than E1/T1 are either not available or too expensive. IMXi-4 is a compact standalone unit. A rack mount adapter kit enables installation of one or two standalone units, side by side in a 19" rack.

DXC Digital Inverse Multiplexer Module

DIM is a Digital Inverse Multiplexer module for the modular Digital Cross Connect units. The DIM module, working in conjunction with dual-port DE1 or DT1 link modules (up to four modules per DIM), enables the DXC to function as an inverse multiplexer. The DIM module is available with a variety of serial port options and Ethernet bridge option. Up to 8 T1/E1 trunks can be inverse multiplexed and aggregated to a single user serial or Ethernet port.



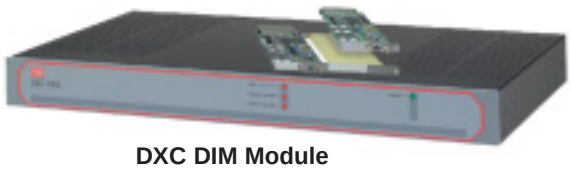
IMX-2

IMX-4T1 & 4E1

Equipment	Order Number
IMX-2 V35 Link&Port/U	RIMX2115V35V35IBU
IMX-4T1 (2) T1 & V35dte	RIMX4T12V35C
IMX-4E1 (2) E1 & V35dte	RIMX4E12V35C
IMX-4T1 (4) T1 & V35dte	RIMX4T14V35C
IMX-4E1 (4) E1 & V35dte	RIMX4E14V35C
IMXi T1	RIMXi-4/AC/T1
IMXi E1	RIMXi-4/AC/E1

Other leased line and link interfaces available including; RS-530, V.36, and X.21.

IMXi-4



DXC DIM Module

Equipment	Order Number
See page 3 for complete ordering options.	

See pages 45 - 46 for ISDN inverse multiplexing products.

Inverse Multiplexers

IMUX modules for Atlas

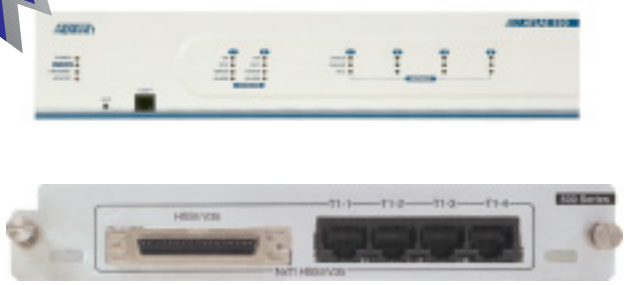
ATLAS 550 NxT1 HSSI/V.35 User Module

The ATLAS 550 NxT1 HSSI/V.35 Module combines multiple T1 circuits into a single logical data stream to an integral High-Speed Serial Interface (HSSI) port or V.35 port using an optional cable. This hot-swappable user module uses an ADTRAN proprietary T1 inverse multiplexing protocol to support point-to-point, high-speed data applications.

The inverse multiplexing capacity of the module accommodates eight T1s, and the module automatically adjusts the data rate to the HSSI/V.35 port upon loss of one or more T1 circuits. In addition to the HSSI port, four T1 ports are included on the module itself, while additional T1 ports can be provided using other ATLAS 550 T1 modules. Dial backup is not available for any bandwidth assigned to the HSSI/V.35 port.

Use of the NxT1 HSSI/V.35 module in the ATLAS 550 Integrated Access Device (IAD) does not impact other applications such as T1, ISDN, and/or Frame Relay. The module can also host any ATLAS 550 Resource Module.

The primary application for this module is high-speed connectivity between two external routers, each configured with a HSSI or V.35 port.



Atlas 550 IMUX Module

Equipment	Order Number
NxT1 HSSI Module	ADTN1200346L2
ATLAS NxT1 V.35 Adapter Cable	ADTN1200763L1
ATLAS 550 Four T1 HSSI/V.35 System	ADTN4200305L3
ATLAS 550 Eight T1 HSSI System	ADTN4200305L4
ATLAS 550 AC Power	ADTN1200305L1
T1/PRI Network Interface Module	ADTN1200307L1
Dual T1/PRI Interface Module	ADTN1200314L1
Quad T1/PRI Interface Module	ADTN1200755L1

See page 6 for more Atlas 550 system options

ATLAS 830/890 NxT1 HSSI/V.35 User Module

The NxT1 HSSI/V.35 Module combines multiple T1 circuits into a single logical data stream to an integral High-Speed Serial Interface (HSSI) port or V.35 port using an optional cable. This hot-swappable module uses an ADTRAN proprietary T1 Inverser Multiplexing protocol to support point-to-point, high-speed data applications.

The inverse multiplexing capacity of the module accommodates eight T1s, and the module automatically adjusts the data rate to the HSSI/V.35 port upon loss of one or more T1 circuits. In addition to the HSSI port, four T1 ports are included on the module itself, while additional T1 ports can be provided using other ATLAS 800 Series T1 modules or a T3 circuit. Dial backup is not available for any bandwidth assigned to the HSSI/V.35 port.

Use of the NxT1 HSSI/V.35 module in the ATLAS Integrated Access Device (IAD) does not impact other applications such as T1, ISDN, and/or Frame Relay.

The primary application for this module is high-speed connectivity between two external routers, each configured with a HSSI or V.35 port.

Atlas 800 IMUX Module

Equipment	Order Number
NxT1 HSSI/V.35 Module	ADTN1200771L1
ATLAS NxT1 V.35 Adapter Cable	ADTN1200763L1
ATLAS 830 AC Power	ADTN1200780L1
ATLAS 830 DC Power	ADTN1200781L1
ATLAS 890, AC Non-Redundant	ADTN4200321L1

See page 5 for more Atlas 800 system options

RAD data communications

STM Statistical Multiplexer Series

The STM High Speed Statistical Multiplexers multiplex up to 24 asynchronous channels onto a single synchronous link. The STM-2 is a miniature statistical multiplexer multiplexing two asynchronous channels onto a single synchronous composite link at data rates up to 19.2 kbps. The STM-4 Statistical Multiplexer, multiplexes 4 asynchronous channels at data rates of 300 to 19,200 bps. The STM-8/HS, STM-16/HS and STM-24/HS multiplex 8, 16, or 24 asynchronous channels on to a high speed link. Channel data rates range from 75 bps to 19.2 kbps and the synchronous composite link operates up to 64 kbps through one of four selectable interfaces: V.24/RS-232, V.35, X.21 or RS-530. Powerful error detection and automatic retransmission ensures error-free performance for all STM Multiplexers.

Extend UNIX Users Remotely !

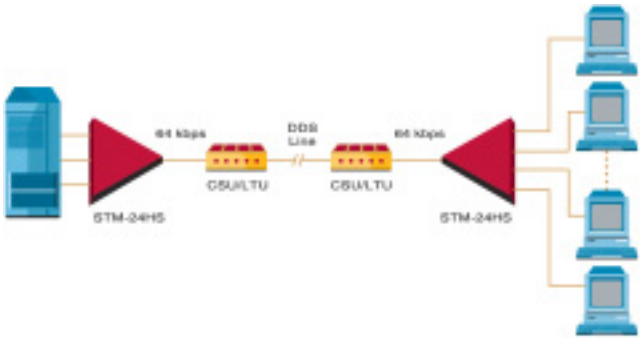
STM-2

STM-4

STM-8 & STM-16

Equipment		Order Number
STM-2	(2) port unit	RSTM2115
STM-4	(4) port unit	RSTM4SA115
STM-8HS	(8) port unit	RSTM8HSV35115
STM-16HS	(16) port unit	RSTM16HSV35115
STM-24HS	(24) port unit	RSTM24HSV35115

230 volt power supply available.
Call for more options.



KLS.2 - Statistical Multiplexing Data Module for Kilomux

The KLS.2 Data Module provides four asynchronous data channels with RS-232/V.24 interface for the KILOMUX. A separate RJ-45 connector is available for each channel. Channel interface is DCE. The data rate on each channel is selectable from 300 to 19,200 bps. All channels are statistically multiplexed onto a single composite bit stream with bandwidth selectable up to 19,200 bps. The composite link is multiplexed onto the KILOMUX main link. Four control signals are supported per channel. One control signal per channel may be transmitted end-to-end for handshaking purposes. Local RTS appears as DCD at the remote site. DTR and CTS are available for use as hard flow control.

Kilomux 2100/2104 with KLS.2 Module

Equipment	Order Number
KLS.2 Stat Mux Module	KM2000MKLS2

See page 12 for full Kilomux ordering options.

T1/E1 CSU/DSUs

TSU ACE
The TSU ACE is a low cost, single-port T1-FT1 DSU/CSU housed in a compact, durable housing with a single V.35 DTE interface. Configuration and control is accomplished via front panel LCD display and keypad.

TSU ACE

TSU LT / ESU LT Single Port E1 or T1/Fractional CSU/DSU
The TSU/ESU LT is a low cost, single-port T1-FT1 or E1-FE1 DSU/CSU housed in a compact, durable housing with a single V.35 DTE interface. The E1 version is G.703, G.704, and G.828 compatible. Terminal interface is available for management and control.

TSU LT / ESU LT

TSU Single Port T1/Fractional CSU/DSU
The TSU is a cost-effective single-port T1-FT1 DSU/CSU available as either a stand-alone or Smart 16 rack-mount unit. The single V.35 DTE interface provided in the stand-alone unit or a Smart 16 card provides synchronous data connections at Nx56/64 rates. For RS-530 interfaces, a Smart 16 rack-mount card is also available.

TSU ESP Single Port T1/Fractional CSU/DSU w/SNMP
The TSU ESP is a cost-effective T1-FT1 DSU/CSU providing integrated SNMP management. The single V.35 DTE interface provides synchronous data connections at Nx56/64 rates for applications such as LAN bridging or videoconferencing. Optional dial backup cards can be used to provide integrated dial backup to Switched 56 or Basic Rate ISDN facilities.

TSU

TSU ESP

ESU 120e E1 Drop/Insert CSU/DSU with Expansion Slot
The ADTRAN ESU 120e™ is a modular, full featured E1-Fractional E1 Multiplexer that supports a wide range of end-user applications. Providing a flexible data port and a G.703 Drop port, the ESU 120e supports international applications combining digital voice and high-speed data. For application flexibility, the ESU 120e can utilize most ADTRAN TSU family data modules in the single expansion slot. The embedded Simple Network Management Protocol (SNMP) allows for complete monitoring and control over the ESU 120e through both a SLIP and a 10BaseT Ethernet interface.

ESU 120e

Equipment	Order Number
TSU LT	ADTN1203060L1
ESU LT	ADTN1200410L1
TSU ACE	ADTN1202295L1
TSU	ADTN1200060L2
TSU Rack Mount Card V.35	ADTN1202077L1
TSU ESP	ADTN1200169L1
TSU ESP Ethernet Card	ADTN1204005L1
TSU ESP ISDN DBU Card	ADTN1204004L1
ESU 120e	ADTN1200420L1

(see page 22 for the Smart 16/16E Rack Mount Chassis System)

RAD data communications

FCD-T1

FCD-T1 is a CSU/DSU for T1 or Fractional T1 services. It can be used as a rate and interface converter or as an integrating multiplexer for T1 and Fractional T1 services. The FCD-T1 also operates opposite RAD's modular DXC (multiservice access node) products or other vendors' T1 equipment for multilink star applications such as access to SONET networks. The DXCs and FCD-T1 operate together with centralized SNMP network management. FCD-T1 can be ordered with a regular T1 (including an integral CSU) or a fiber optic link. Both configurations are also available with an optional sub-T1 drop & insert port. The unit can be ordered with either one or two data ports. The second port can be an Ethernet bridge port.

FCD-E1

The FCD-E1 is an access unit for E1 or Fractional E1 services. It can be used as a rate and interface converter or as an integrating multiplexer for E1 and Fractional E1 services. FCD-E1 can be ordered with a regular E1 (G.703) or a fiber optic link. Both configurations are also available with an optional sub-E1 drop & insert port. The unit can be ordered with either one or two data ports. The second port can be an Ethernet bridge port.

FCD-14 and FCD-24 T1 or E1/Fractional Multiport CSU/DSU

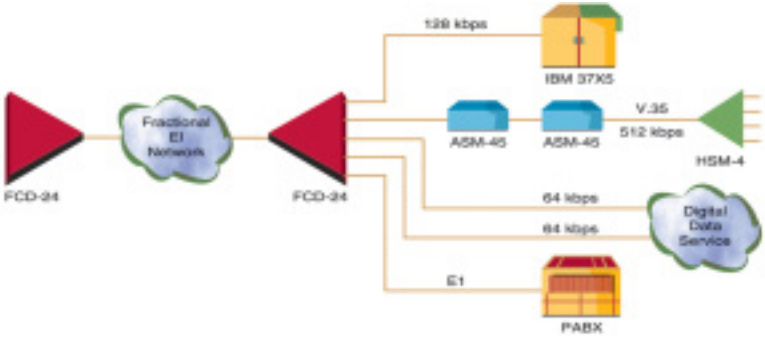
The FCD-14 is an integrating multiplexer for Fractional T1 services. Up to four synchronous data channels and one T1 sub link can be connected over the public T1 network, while paying only for the bandwidth required. The T1 sub link enables PBX connection to the T1 interface. Three models are available: **FCD-14** has four synchronous data channels. The **FCD-14/T1** has four synchronous data channels and one T1 sub link. **FCD-14-2/T1** has two synchronous data channels and one T1 sub link. The **FCD-24** is an **E1** Version. Data rates are selectable for any multiple of 56 or 64 kbps. Selectable timeslot assignment places data into timeslots (DS0s) either consecutively, alternately or user-defined without restriction.

FCD T1/E1

Equipment	Order Number
FCD-T1, Single V.35	FCDT1ACV35
FCD-T1, Single RS-530	FCDT1AC530
FCD-T1, V.35, DSX-1	FCDT1ACSV35
FCD-T1, RS-530, DSX-1	FCDT1ACS530
FCD-T1, V.35, Ethernet	FCDT1ACVETU
FCD-T1, Dual V.35	FCDT1AC2V
FCD-T1, Dual RS-530	FCDT1AC2R
FCD-T1, Dual V.35, DSX-1	FCST1ACS2V
FCD-T1, Dual RS-530, DSX-1	FCDT1ACS2R
FCD-E1, Single V.35	FCDE1ACV35
FCD-E1, Single RS-530	FCDE1AC530
FCD-E1, V.35, SUB E1	FCDE1ACSV35
FCD-E1, RS-530, SUB E1	FCDE1ACS530
FCD-E1, V.35, Ethernet	FCDE1ACVETU
FCD-E1, Dual V.35	FCDE1AC2V
FCD-E1, Dual RS-530	FCDE1AC2R
FCD-E1, Dual V.35, SUB E1	FCSE1ACS2V
FCD-E1, Dual RS-530, SUB E1	FCDE1ACS2R

All of the above units are available with AC power, 48VDC and fiber optic T1/E1 ports. Contact Pulse for ordering assistance.

FCD-14/24



Equipment			Order Number
FCD-14	(4) Ports	V35	RFCD14V35115
FCD-14	(4) Ports	D&I	RFCD14T1V35115
FCD-14	(2) Ports	D&I	RFCD142T1V35115
FCD-24	(4) Ports	V35	RFCD24V35115
FCD-24	(4) Ports	D&I	RFCD24E1V35115
FCD-24	(2) Ports	D&I	RFCD242E1V35115

Call or email Pulse for more options on this product.

T3/E3 CSU/DSUs

ADTRAN

T3 CSU/DSU with HSSI !

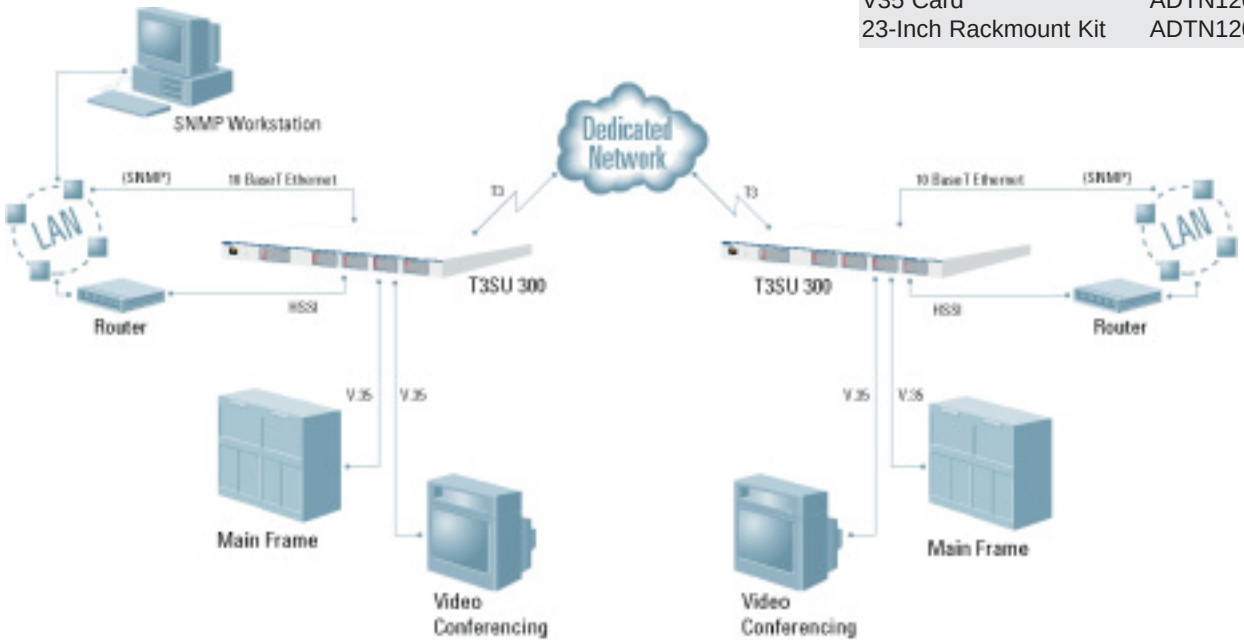
T3SU 300

T3SU 300 (rear view)

T3SU 300 CSU/DSU for T3 Networks

The T3SU 300 provides a cost-effective versatile approach for customers migrating from T1 to T3 services. The T3SU 300 provides a user the ability to use up to four data ports. This flexibility allows the user to spread the cost of the service among multiple applications. One HSSI interface is built in along with three slots which accept additional HSSI or V.35 interfaces. The HSSI interfaces support rates between 75k and 44.2 Mbps in 75 kbps increments. The high speed V.35 option supports rates up to 10 Mbps in increments of 75 kbps. SNMP and Telnet are available through either a SLIP/PPP port or a 10BaseT Ethernet port. Complete configuration, diagnostics and performance monitoring are available through SNMP, Telnet, or the VT 100 craft interface. The T3SU 300 is designed for either desktop use or installation in a 19-inch rack.

Equipment	Order Number
T3SU 300	ADTN1202217L2
T3SU 300 DC	ADTN1200217L4
DSX-1 Card	ADTN1200284L1
HSSI Card	ADTN1200218L1
V35 Card	ADTN1200219L1
23-Inch Rackmount Kit	ADTN1200171L1



RAD data communications

RIC-T3/E3

RIC-E3/ETH, RIC-T3/ETH 10/100BT to E3/T3 Converters

RIC-E3/ETH and RIC-T3/ETH interface converters offer simple, cost-effective connection between E3/T3 services and 10/100BaseT LANs. RIC-E3/ETH and RIC-T3/ETH transparently connect unframed E3/T3 and 10/100BaseT links, utilizing the full E3/T3 bandwidth without heavy overhead associated with packet or cell-based technologies. Built-in Ethernet bridge with VLAN support enables virtual LAN connections.

Equipment	Order Number
T3, DC Power	RIC-T3/DC
T3, AC Power	RIC-T3/AC
E3, DC Power	RIC-E3/DC
E3, AC Power	RIC-E3/AC

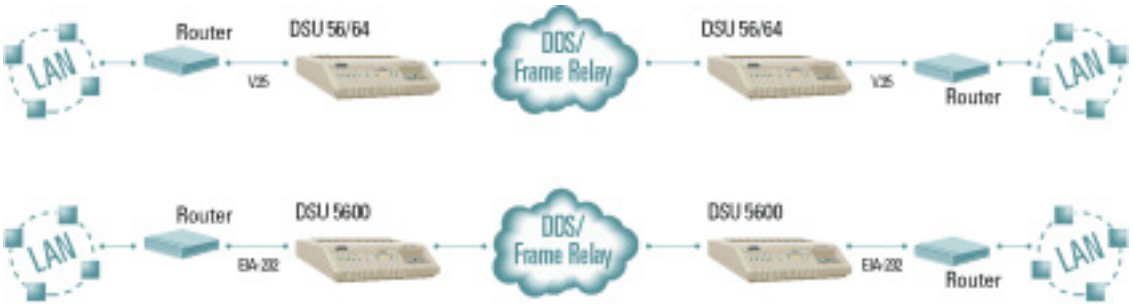
ADTRAN

DSU 56/64 and DSU 5600 Economical 56/64Kbps CSU/DSU's

The DSU 56/64 and DSU 5600 are economically priced units for application specific DDS or Frame Relay networks. Both units support 56 kbps and 64 kbps loop service rates in point-to-point or multi-point DDS applications. The DSU 56/64 has a V.35 DTE interface that operates synchronously at either 56 or 64 kbps. The DSU 5600 has an EIA-232 DTE interface that operates synchronously at 56 and 64 kbps and asynchronously up to 57.6 kbps. All setup and configuration is accomplished with a single eight-position DIP switch accessible from the back panel. Both units feature multiple test and diagnostic capabilities.

DSU 56/64 & DSU5600

Equipment	Order Number
DSU 56/64	ADTN1200062L1
DSU 5600	ADTN1200078L1



ADTRAN

IQ 710 Frame Relay Aware CSU/DSU for 56/64k

The IQ™ Series from ADTRAN provides intelligent traffic management so users can make the most of existing bandwidth. This series includes features ranging from performance monitoring and traffic shaping to standard Frame Relay circuit management and trouble-shooting. The IQ 710™ is a modular device with interface options for 56/64K, T1/FT1, T1 Probe and T1/FT1 with DSX-1 voice capability. It offers complete visibility from the Physical to the Application Layer, maintaining an extensive list of network statistics that aid in planning and trouble-shooting.

Optional dial backup functionality is available for network contigency planning using Safe-T-Net™. Safe-T-Net is ADTRAN's technology that provides dial backup for network recovery of Frame Relay Traffic.

The IQ 710 provides two expansion slots for network interface and dial backup cards and features a 10BaseT Ethernet port for management applications. This product provides up to a full T1 of access and gathers information from all seven layers of the network. The IQ 710 uses industry-leading technology to perform seven-layer monitoring and traffic shaping and includes the necessary software to capture and report network information.

IQ 710

Equipment	Order Number
IQ 710 with 56/64K and Shaping	ADTN4202811L1
IQ 710 with 56/64K Interface	ADTN4202801L1
56/64K Network Interface Module	ADTN1202801L1
IQ 710 V.34 DBU Module	ADTN1204002L3
IQ 710 ISDN BRI DBU Module	ADTN1204004L2
IQ 710 External DCE DBU Module	ADTN1204006L2
IQ 710 ISDN PRI DBU Module	ADTN1204008L2

DDS CSU/DSUs (up to 64Kbps)

ADTRAN

Dial Back Up CSU/DSU !

DSU IV ESP

DSU IV ESP All Rate/All Purpose SMNP 56/64k CSU/DSU

The DSU IV ESP is an all rate DSU/CSU with embedded SNMP, supporting services from 2.4 to 64 kbps. Embedded SNMP is available through a SLIP/PPP port or through a 10BaseT Ethernet port when optioned with the ESP Ethernet Card. The DSU IV ESP is used in either point-to-point, multi-point, or virtual circuits such as Frame Relay. The interface can operate asynchronously up to 57.6 kbps or synchronously up to 64 kbps. The unit also has a Switched 56 (4-wire) capability where dialing is accomplished from the front panel, in-band AT commands, or V.25 bis. Both EIA-232 and V.35 DTE interfaces are provided. The DSU IV ESP also operates as a dedicated DSU with automatic switched backup in the event of a dedicated line failure. The addition of dial backup is accomplished through a family of plug-in ESP DBU cards. There are three ESP DBU cards available: **4-wire Switched 56**, **V.34 modem**, and 1B+D **ISDN**.

Equipment	Order Number
DSU IV ESP	ADTN1204011L1
ESP DBU Cards:	
4 Wire SW 56	ADTN1204001L1
V.34 Modem	ADTN1204002L2
ISDN	ADTN1204004L1
ESP Ethernet Card	ADTN1204005L1

DSU III AR

DSU III AR

The ADTRAN DSU III AR is a technologically advanced, high performance data service unit / channel service unit (DSU/CSU). This unit provides a reliable interface between the digital data service (DDS) or 4-wire Switched 56 (SW56) network and the customer's data terminal equipment (DTE). The unit is an all-rate DSU/CSU supporting synchronous and asynchronous data rates on the primary channel and asynchronous data rates on the secondary channel. The synchronous primary channel rates supported are 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 kbps. Asynchronous data rates supported are 2.4, 4.8, 9.6, 19.2, 38.4 and 57.6 kbps. Secondary channel data rates of 75, 150, 300, 600, 1200, and 2400 bps are offered depending upon the primary channel rate. The DTE interface can be selected as either EIA-232 or V.35 for all data rates. The secondary channel interface is EIA-232 and is accessed through a separate connector.

The DSU III S2W is also available which provides an interface between 2-wire Switched 56 and the customer's data terminal equipment (DTE). The unit supports both synchronous and asynchronous data rates. Synchronous rates supported are 2.4, 4.8, 9.6, 19.2, 38.4, and 56 kbps. Asynchronous data rates are provided from 2.4 to 38.4 kbps and 57.6 kbps. Both EIA-232 and V.35 DTE interfaces are provided for all data rates.

The DSU III TDM is a 4-Port TDM DSU/CSU for 4-wire dedicated DDS applications. The unit provides four EIA-232 DTE Interfaces for multiplexing up to four devices to a single DDS circuit.

Equipment	Order Number
DSU III AR AC	ADTN1202011L1
DSU III AR (RM)	ADTN1200034L1
DSU III AR DC	ADTN1200270L1
DSU III S2W	ADTN1200015L2
DSU III TDM	ADTN1200063L1

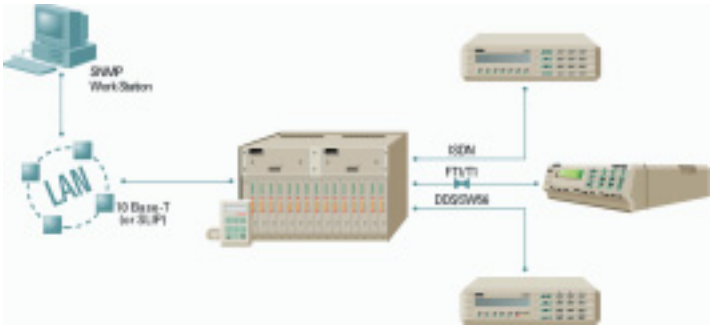
ADTRAN

Smart 16/16e Shelf for High Density Applications

The Smart 16/16e is a rack-mount system that complements the DSU III, ISU, and TSU products. The Smart 16 shelf provides a 19 or 23 inch rack-mount solution for up to 16 rack-mount DSU/CSUs, satisfying larger applications. The shelf and all installed units are powered by an internally mounted AC or DC supply. The user has the option of ordering a second supply, allowing redundant protection. The Smart 16 shelf has a controller card for configuring and controlling the units installed in the local shelf. The controller card also allows access to 15 additional Smart 16 shelves. The controller card can be accessed by using the hand-held DATAMATE or through the EIA-232 interface. The EIA-232 interface supports a local terminal or remote terminal through a modem connection. The user can configure, test, and monitor both the local and remote units. Embedded SNMP is available in the Smart 16e shelf using the Smart 16e controller card. The embedded SNMP agent has both a SLIP/PPP port and a 10BaseT ethernet port to provide access to up to 256 Smart 16 devices.

High Density CSU/DSU Solution !

Smart 16 Shelf



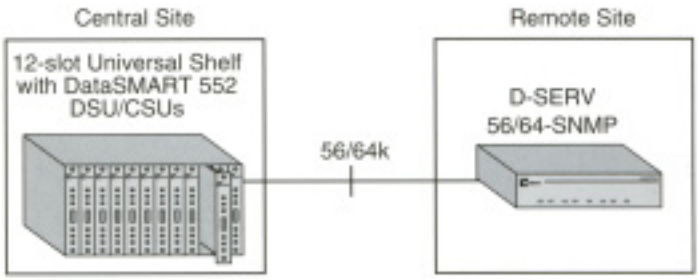
Equipment	Order Number
Smart 16 Shelf AC	ADTN4202023L3
Smart 16 Shelf DC	ADTN4202023L4
Smart 16e Shelf AC	ADTN4202023L5
Smart 16e Shelf DC	ADTN4202023L6
Redundant Power Supply	
Smart 16 Shelf AC	ADTN1200048L3
Smart 16 Shelf DC	ADTN1200048L4

ADC Universal 2 and 12 Slot Shelves

With 2- and 12-slot models, the Universal Shelf is the best way to grow your network and gain the most out of your investment -- now and for years to come.

The Universal Shelf offers the benefits of a compact footprint, cleaner cable management, and simplified network management. Its flexibility and space-saving advantages make the Universal Shelf the best way to mix, match and manage a custom configuration of up to twelve T1 and 56k DSU/CSUs. It is ideal for large corporate networks, Internet Service Providers (ISPs), and carriers juggling multiple T1 lines. Plug in modules are available for DDS and T1 DSU/CSUs.

Universal Shelves



Equipment	Order Number
Universal Shelf, 2-slot DC	ADC78070
Universal Shelf, 2-slot AC	ADC78075
Universal Shelf, 12-slot DC	ADC78270

VoIP and Voice Compression

QUINTUM

Tenor VoIP Gateway

The Tenor Gateway is the first VoIP MultiPath gateway that intelligently switches calls over both IP networks and the PSTN in order to ensure high voice quality. Unlike conventional VoIP gateways that only route calls over IP networks, the Tenor Gateway can transparently switch calls over to the PSTN if IP network congestion or a device failure impacts voice quality.

Digital (T1/E1) and analog versions of the Tenor Gateway are available. Both systems are completely interoperable. Systems can be upgraded in increments of eight channels. When a single chassis has reached the maximum port density, multiple units may be stacked. There is no limit to the number of units that can be grouped.

AS, AX and DX VoIP Gateways

The next generation of compact, high density gateways is here. All of the same features as the Tenor line and more are packed into these powerful new gateways.

An **integrated gatekeeper and border element** are available in all Tenor, DX and AX systems. Conforming to the H.323 protocol, the gatekeeper provides crucial interoperability for today's networks. Its services include admission control, call management and control, address translation and bandwidth control. The Tenor MultiPath Gateway also offers a redundant border element that conforms to H.323 Annex G, providing an extremely scalable solution.

Tenor Gateway Digital T1/E1

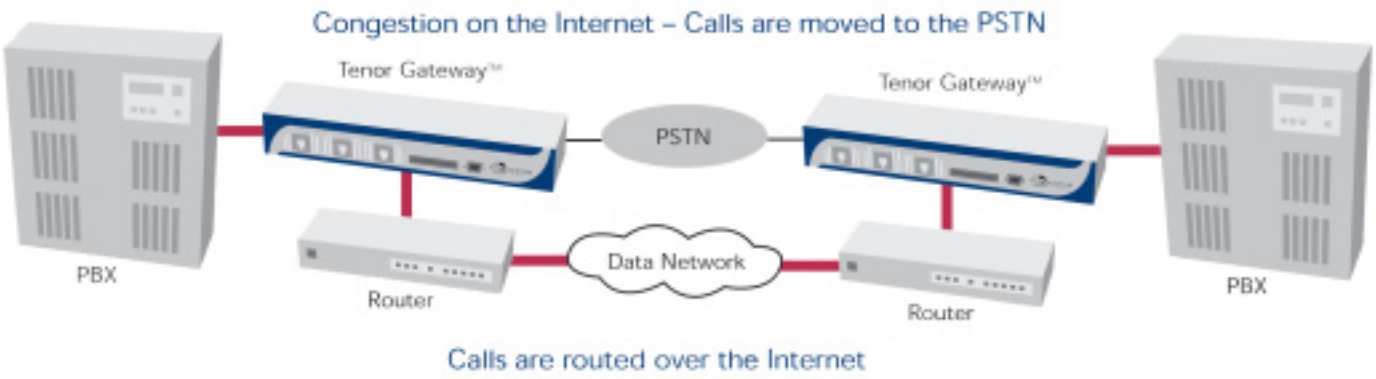
Tenor Gateway Analog 4/8 Port

Tenor Gateway Analog 2 Port

Equipment	Order Number
TENOR Series	
Tenor 24 CH T1/E1	D2400
Tenor 32 CH T1/E1	D3200
Tenor 4 CH Analog	A400
Tenor 8 CH Analog	A800
Tenor 2 CH Analog	A200
ENHANCED AS/AX/DX Series Gateways	
2 T1 Gateway	DX2048
2 E1 Gateway	DX2060
4 T1 Gateway	DX4096
4 E1 Gateway	DX4120
8 FXO Gateway	AX800
16 FXO Gateway	AX1600
24 FXO Gateway	AX2400

Tenor DX E1/T1 Gateway

Tenor AX FXO/FXS Gateway



QUINTUM TECHNOLOGIES, INC.

Carrier Class VOIP Switch

Quintum CMS

The Quintum Tenor Carrier MultiPath Switch gives CLECs, ISPs, and other telecommunications entrepreneurs an easy, cost-effective way to deliver low-cost, high-quality voice services over IP networks. The Tenor integrates a gateway, a gatekeeper, intelligent call routing and supports QoS all in one solution. Residing in your POP and connected to Tenor units on customer premises via IP, the Tenor CMS provides a complete VoIP solution with a MultiPath architecture that allows you to use both your data network and the public switched telephone network to provide voice service. By providing greater assurance of call quality and reliability, this unique capability makes VoIP services easier for you to sell to today's risk-averse customers, easier to customize for individual customer needs, and easier to scale as your business expands.

SelectNet™ intelligence takes the risk out of VoIP. With patented SelectNet™ Technology, the Tenor continuously monitors your data network on a call by call basis for jitter, latency, and packet loss, and transparently switches customer calls to the PSTN when required. This intelligent switching allows you to achieve the QoS targets your customers demand, at costs that traditional phone companies simply cannot match.

Tenor CMS 1U Chassis

Tenor CMS 4U Chassis

Equipment	Order Number
Call for ordering details and upgrades	

PacketSaver™ intelligence minimizes network congestion. With PacketSaver™ Technology, the Tenor reduces bandwidth consumption up to 50%, by combining voice packets from several calls into a single packet to minimize bandwidth overhead.

NATAccess™ intelligence means greater security. The Tenor VoIP MultiPath Switch also features a unique technology that allows it to operate behind NAT-enabled firewalls. The innovative NATAccess™ solution overcomes the problem of NAT firewalls not correctly translating internal IP addresses into public addresses when a VoIP call is established with an outside party.

- **Up to 32 T1/E1 Interfaces**
- **SelectNet™ for superior voice quality**
- **TDM Switching**
- **Up to 960 Voice Channels**
- **IVR/RADIUS AAA compliant**
- **Hot-swappable system components**
- **Scalable chassis-based VoIP switch**
- **Integrated H.323 gateway and gatekeeper**
- **Least Cost Routing**
- **Built-in multi-lingual IVR**
- **Transparent MultiPath Call Routing**
- **Industry standard 19" form factor**

VoIP and Voice Compression

Tenor Call Routing Server

The Quintum® Tenor VoIP Call Routing Server provides CLEC's, ILEC's, ISP's and next generation service providers with scalable centralized network routing, policy enforcement, and administration. The VoIP Advanced Call Routing Server provides enhanced network-wide routing flexibility including QoS-based routing, least-cost routing and source-based routing. Routing server will compile network routing statistics and generate network reports. A scalable solution designed to support demanding applications such as Wholesale VoIP Termination, Tandem Switching, Call Centers, IP Local Loop, Least Cost Routing and Calling Cards.

Call Routing Server

Equipment	Order Number
Call Routing Server	501-0067-00
10 CPS Upgrade	505-0040-00
25 CPS Upgrade	505-0041-00
50 CPS Upgrade	505-0042-00

Centralized Control: Scalable design allows for the management of mid to large sized networks. Multiple Call Routing servers may be distributed within the voice network for even greater capacity and redundancy. Routing modifications are immediately reflected throughout the entire voice network without the need for routing modification on individual gateways.

QoS Monitoring and Routing: Monitors Quality of Service (QoS) metrics throughout the VoIP network. The Call Routing Server allows calls to be routed around portions of the network that are not supporting acceptable QoS characteristics, thereby assuring high quality voice for end users.

Flexible Routing: Source-based routing enables user-defined routing criteria to be applied depending upon the subscriber or ingress point into the voice network. Routing criteria include Least Cost Routing, Route Quality, Best Pattern Match, Circuit Routing, Domain Priority, Answer Seizure Ratio (ASR), and Load Balancing. Routing criteria and prioritization is configurable for each ingress point into the voice network and limits calls to routes or dialed numbers to better manage network endpoint loading.

Tenor Call Relay SP (Service Provider)

- VoIP switching between IP networks
- Supports IP endpoints behind NAT and firewall
- Up to 760 simultaneous VoIP calls

Tenor Call Relay

Equipment	Order Number
Call for ordering details and upgrades	

Quintum's Tenor Call Relay™ provides a single VoIP portal between IP networks allowing for end to end VoIP communications across multiple IP networks. All calls are switched through multiple IP networks with just one single compression and decompression of the voice. The result is less latency and higher voice quality as the call traverses through the network.

The Tenor Call Relay allows VoIP endpoints behind a Network Address Translation (NAT) and firewall to communicate with external VoIP networks. This allows both enterprises and service providers to expand their VoIP networks to their customers and partners, and across the public Internet. Tenor Call Relay provides a single point for call management, administration and security at the edge of your VoIP network.

When networks are linked using circuit switched connections, the multiple compression and de-compression processes that occur increase transmission delay and cause unnecessary degradation of the voice quality. Tenor Call Relay eliminates these delays with its direct IP connection between VoIP networks, thereby increasing voice quality.

With its built-in NAT intelligence, the Tenor Call Relay is able to pass H.323 traffic transparently through your IP networks' NAT and firewalls. With its PacketSaver™ technology, the Tenor Call Relay reduces bandwidth consumption of VoIP calls by multiplexing multiple calls into the same packet, reducing the overall bandwidth utilization by up to 50%, beyond voice compression and silence suppression.

VMUX-2100 Compressed Voice Trunking System

The Vmux-2100 is a modular Voice Trunking Gateway that compresses and transports up to 16 E1 or T1 voice trunks over E1, T1 or IP links. Vmux-2100 employs G.723.1, G.729 Annex A and G.711 compression algorithms, together with RAD's unique TDMoIP multiplexing, to transmit up to 480/384 voice channels, including transparent CAS and CCS signaling, over a single E1/T1 or IP link.

VMUX-2100

Voice Activity Detection (VAD) and silence suppression techniques are used by Vmux-2100, so that bandwidth is only allocated when it is required, thus conserving bandwidth. The gateway detects, generates and relays DTMF/MFR2/MFC signaling. Vmux-2100 is unique in that it is a single device that can transmit compressed voice over both TDM and IP networks, and can easily switch between them whenever this may be advantageous or necessary. Switching transmission between TDM and IP links does not require additional investments in equipment and only minimal configuration changes.

The Main Link module features a single 10/100BaseT UTP or fiber optic Ethernet port with optional Auto-Negotiation support. The Ethernet port operates at 10/100 Mbps speeds, half and full duplex. The Ethernet interface is compliant with the IEEE 802.3 standard. It supports full Auto-Negotiation according to 802.3x flow control for full duplex, and backpressure option for half duplex.

Equipment	Order Number
VMUX-2100 AC Chassis	VMUX-2100/AC
VMUX-2100 DC Chassis	VMUX-2100/48
E1 Main Link Module	VMUX-M/M-ETH/E1
T1 Main Link Module	VMUX-M/M-ETH-T1
4-E1 Voice Module	VMUX-M/VC-E1/4
4-T1 Voice Module	VMUX-M/VC-T1/4
2-E1 Voice Module	VMUX-M/VC-E1/2
2-T1 Voice Module	VMUX-M/VC-T1/2
Spare AC Power Supply	VMUX-2100-PS/AC

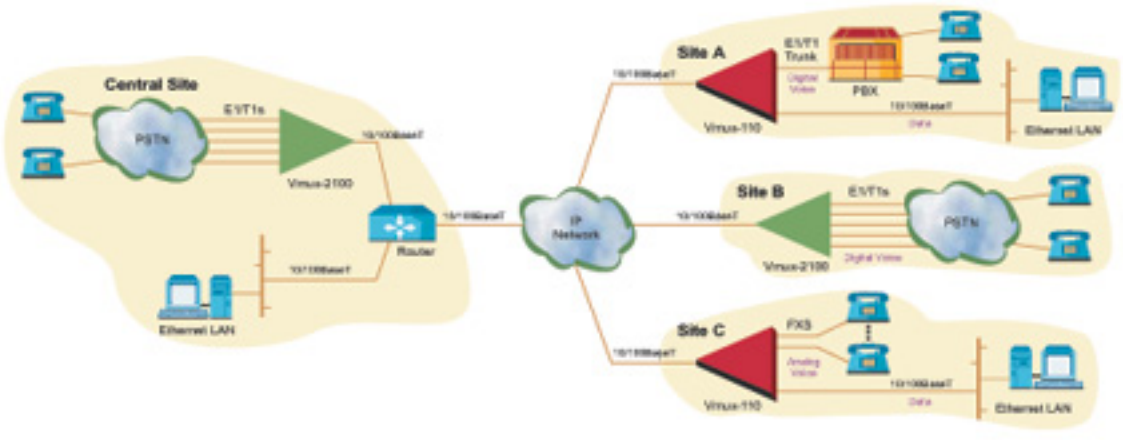
VMUX-110 Voice Trunking Gateway

Vmux-110 is a customer-located device that complements the larger modular Vmux-2100 system, fulfilling the need for a low capacity remote voice trunking gateway for both IP and leased line TDM networks. Vmux-110 is available with either an E1 or T1 port for digital voice channels or four FXS ports for analog POTS.

VMUX-110

The Vmux-110 compresses voice traffic and transports it over either a serial TDM link or a 10/100BaseT IP link. The device employs G.723.1, G.729 Annex A and G.711 compression algorithms together with RAD's unique TDMoIP multiplexing, including transparent CAS and CCS signaling.

Equipment	Order Number
VMUX-110 E1	VMUX-110/AC/E1
VMUX-110 T1	VMUX-110/AC/T1
VMUX-110 FXS	VMUX-110/AC/4FXS



xDSL Products

Total Access 3000 Multiservice Access Platform

Total Access 3000

The ADTRAN TM Total Access® 3000/3010 is an open architecture, Carrier-class multiservice access platform for deploying broadband and xDSL services from TDM or ATM backbone infrastructures. Its compact size (23 in./19 in. x 6 in.) (58.42 cm/48.26 cm x 15.24 cm) allows installation in places where space is limited, such as crowded COs, RT cabinets, co-location (COLO) sites, and customer premises equip-ment rooms. The Total Access platform provides a variety of loop and network interface modules. Many interfaces support Automatic Protection Switching (APS). For today's TDM networks, the Total Access supports DSX-1, DS3, STS-1, and OC-3 network interfaces with companion loop interfaces such as HDSL, HDSL2, HDSL4, T1, ISDN, and fiber. ATM network interface modules support G.shdsl, ADSL, IDSL, Frame Relay, and DSX-1 loop interfaces. Total Access 3000/3010 can be integrated with ADTRAN's Total Access 1500/850/750 platforms to provide narrow-band services such as POTS, ISDN, and DDS.

An available Octal ADSL module with Splitters (p/n 4181405L2) is comprised of the ADSL Data Module (p/n 1181405L2) and the POTS Carriage Module (p/n 1181405L20). It provides eight ADSL + POTS interfaces in a dual slot access module for the Total Access 3000 and Total Access 3010. The eight ADSL loops are configurable individually on a loop-by-loop basis using Total Access 3000/3010 standard menus. This unit supports T1.413, G.dmt and G.Lite standards. It supports upstream rates from 32 to 896 kbps and downstream rates from 32 to 8160 kbps increments, in either Fast (default) or Interleaved mode.

Total Access 1200 Mini DSLAMs

Total Access 1200

Carriers are seeking DSL solutions that deliver broadband simply and reliably to their valued customers. In order to make DSL delivery a business success, carriers need solutions that control costs, simplify management, and provide advantageous support systems. The ADTRAN Total Access® 1200 Series of Mini-DSLAMs were designed with service providers in mind. From anticipated take rates and low start-up costs to scalability for future applications, the Total Access 1200 Series offers the advantages carriers need to make DSL affordable and maintainable. The Total Access 1200 Series of Mini-DSLAMs are temperature-hardened, 1U high mini-DSLAMs that enable delivery of 24 ports of POTS, ADSL, and IP Ethernet service from smaller Central Offices (COs), Controlled Environmental Vaults (CEVs), and Remote Ter minals (RTs). Design flexibility enables the Total Access 1200 Series to be mounted as rack, wall, or vertical positioned units inside existing enclosures. The units measure 1.75 in. H x 17.25 in. W x 11.13 in. D and offer redundant power using –42 to –56 VDC.

Total Access 1124 OSP DSLAM

Total Access 1124

ADTRAN's Total Access 1124 OSP DSLAM is a 24-port DSLAM that answers service provider's need for universal access. Through line or local powering, it delivers DSL to any location with the reliability expected of an ADTRAN product. The Total Access 1124 OSP DSLAM is an economical solution for extending DSL access to every subscriber.

These line-powered OSP DSLAMs can bemounted in any outdoor environment including pedestals, poles, cross-boxes, remote terminals, and other challenging locations. Additionally, it can be used as a customer premises device for rapid deployment in response to customer demand or ompetitive pressures. POTS service is not power dependent.

Equipment	Order Number
TA 1210 ATM Mini-DSLAM	ADTN4179611L1
Total Access 1211 Mini-DSLAM	ADTN4179611L2
Total Access 1213 Mini-DSLAM	ADTN4179613L1
Total Access 1214 Mini-DSLAM	ADTN4179614L1
Total Access 1230 Mini-DSLAM	ADTN4179615L1
Total Access 1250 Mini-DSLAM	ADTN4179611L3
Total Access 1124 OSP DSLAM	ADTN1179724L1

LRS-52 SHDSL MODEM Rack

The LRS-52 is a manageable access system that offers a complete SHDSL solution in the Local Loop. Each port in the LRS-52 works opposite an SHDSL remote device in a point-to-point configuration, providing each port with an independent connection. The product supports SHDSL technology in full compliance with ITU and ETSI standards. The LRS-52 is a costeffective non-modular modem rack that can be used with a dedicated number of ports. The user can choose between 12 and 24 ports in the 2-wire version, and between six and 12 ports in the 4-wire version. The LRS-52 is available in separate versions for each user interface (E1, V.35 or X.21).

LRS-52 SHDSL MODEM Rack

The LRS-52 has an SNMP agent on board that provides full SNMP management of the central and the remote units. It includes a built-in Ethernet bridge and dual Ethernet ports for the connection of a large number of racks to single or multiple management stations. The same Ethernet segment used for managing the LRS-52 can be used to manage other elements in the network, such as backbone equipment, from the same management station. The LRS-52 has two additional ports, one for local ASCII terminal management and the other for station clock connection. The RADview SNMP application running on an HP OpenView or PC platform enables full management of the LRS-52 and the remote ASMi-52.

The LRS-52 can operate with either a single or dual AC or DC power supply. Each power supply supports a working rack, enabling replacement during operation without any effect on system performance.

ASMi-52 2/4 Wire SHDSL MODEM

The ASMi-52 modem uses SHDSL technology, complying with the ITU and ETSI standards, to extend the range of digital interfaces. The ASMi-52 device offers extended distances and variable data rates up to 2.3 Mbps over 2-wire and 4.6 Mbps over 4-wire.

It uses TC PAM-16 line coding, equalization, adaptive filtering and echo cancellation to compensate for line impairments, bridge taps and mixed cabling. This provides high immunity to background noise and enables transmission of multiple SHDSL lines on the same physical cable.

The ASMi-52 extends the range of 2 Mbps data transmission up to 4 km (2.5 miles) over 2-wire cable and even further over 4-wire cable. It supports E1 (according to ITU G.704), V.35, RS-530, X.21, Ethernet bridge and IP router user interfaces.

Standards compliance enables the ASMi-52 to work opposite third-party vendor TDM equipment that supports the SHDSL standard. It also works opposite the LRS-52 SHDSL modem rack, the LRS-24 rack and the DXC SHDSL modules. Monitoring, control and diagnostics of local and remote units are available via a supervisory port. The ASMi-52 includes an SNMP agent in both standalone and card versions.

ASMi-52

Equipment	Order Number
LRS-52 V.35 Chassis	LRS-52/AC/V35
LRS-52 X.21 Chassis	LRS-52/AC/X21
LRS-52 E1 Chassis	LRS-52/AC/E1
ASMi-52 Serial V.35	ASMi-52/AC/V35
ASMi-52 Serial X.21	ASMi-52/AC/X21
ASMi-52 Ethernet	ASMi-52/AC/UTP
Dual Modem Card for LRS Ethetnet	ASMi-52CD/UTP
Dual Modem Card for LRS V.35	ASMi-52CD/V35
Dual Modem Card for LRS X.21	ASMi-52CD/X21

xDSL Products

RAD data communications

ASM-60 VDSL MODEM

Using symmetrical VDSL technology, ASM-60 operates at rates up to 10 Mbps over 4-wire lines. The ASM-60 extends the range of digital equipment up to 2km (1.6 miles) over 24 AWG (0.5 mm) 4-wire copper cable. This eliminates the need for repeaters or optical cable in the last mile (local loop) or in a campus network environment.

The ASM-60 compensates for line impairments and mixed cabling by using advanced equalization, adaptive filtering, echo cancellation technology and QAM line coding.

ASMi-51 2-Wire 2.3Mbps MSDSL MODEM

The ASMi-51 is a multirate SDSL modem that offers variable rates and extended distances over a single pair. ASMi-51 enables wide coverage of customer sites and can support customers at distances of up to 6 km (3.7 miles) over 26 AWG lines. Eighteen different line rates are supported to achieve maximum distances. Data rates can be configured according to user needs. Thirty-three different data rates are supported on the DTE side, ranging from 64 kbps to 2.3 Mbps. An embedded management channel transmits remote control and diagnostic information with no interference to the data flow. Digital interfaces supported are: V.35, X.21 , RS-530, V.36, G.703 (at 2.048 Mbps), a built-in Ethernet bridge and a built-in router. The ASMi-51 is available as a standalone modem or as a quad modem card in the LRS-24 modem rack.

ASMi-50 2/4-Wire Extended Range MSDSL MODEM

The ASMi-50 2/4-wire modem provides an extended range up to 9 km (6 miles) over 24 AWG line. It operates over 2-wire or 4-wire interfaces (user-selectable). An out-of-band management channel allows the user to monitor and control the remote unit even while the data link is out of sync. Real-time management alarms reflect the actual status of both local and remote units and of the connecting link.

Several interface options are available: V.24/RS-232 (64 and 128 kbps only), V.35, X.21 , RS-530, V.36/RS-449, built-in Ethernet bridge, built-in router and G.703 codirectional (64 kbps). The ASMi-50 is available as a standalone master unit with front panel LCD or as a slave with a blank panel and portable control unit (PCU) to prevent unauthorized operation. Card versions are available for the ASM-MN-214 and LRS-24 19" racks. The LRS-24 enables SNMP management on the internal ASMi-50 card and on the remote unit. A double modem card for the LRS-24 increases density and reduces the price per port.

ASM-60

Equipment	Order Number
CO Unit, 48VDC, Ethernet	ASM60CO48UTP
CO Unit, 24VDC, Ethernet	ASM60CO24UTP
CO Unit, AC, Ethernet	ASM60COACUTP
CPE Unit, 48VDC, Ethernet	ASM60CP48UTP
CPE Unit, 24VDC, Ethernet	ASM60CP24UTP
CPE Unit, AC, Ethernet	ASM60CPACUTP

ASMi-51

Equipment	Order Number
AC, Ethernet	ASMi51ACUTP
DC, Ethernet	ASMi51DCUTP
AC, V.35	ASMi51ACV35
DC, V.35	ASMi51DCV35
QUAD MODEM Card, Ethernet	ASMi51CQBUTP
Dual MODEM Card, Ethernet	ASMi51CDBUTP
QUAD MODEM Card, V.35	ASMi51CQBV35
Dual MODEM Card,, V.35	ASMi51CDBV35
MODEM RACK w/ SNMP	LRS24/AC

ASMi-50

Equipment	Order Number
Master, AC, V.35	ASMi50MACV35
Slave, AC, V.35	ASMi50SACV35
Master, AC, Ethernet	ASMi50MACUTP
Slave, AC, Ethernet	ASMi50SACUTP
Portable Control Unit	ASMi50PCU

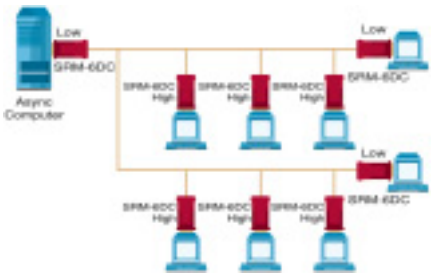
Short Haul MODEMs

RAD data communications

Miniature Short Haul Modems !

SRM Series

SRM Series of Miniature Short Haul Modems



The SRM short haul modems offer a simple, low cost, and highly reliable method to connect digital devices in a local, campus or metropolitan environment. SRM short haul modems connect computers, terminals, Bridges, Routers and similar data communications devices inside buildings, campuses or within city boundaries. They support simple point to point communications or very complex multipoint campus-wide systems. These units are normally powered by the electrical interface they attach to, requiring no AC power. Data Rates are up to 128Kbps. Link Interfaces are Twisted pair, Coax or Fiber. The SRM series is also available in High Density Chassis systems. Some of the electrical Interfaces they extend are:

- V.35
- V.36
- RS-232
- RS-449
- RS-530
- V.24
- X.21
- RS-422

Equipment	Order Number
Due to the many options and configurations, please call your nearest Pulse office or email your requirements.	

ASM Series of Short Range Modems and "Last Mile" Access

The ASM short haul modems connect digital devices in a local, campus or metropolitan environment similar to the SRM family, but provide expanded capabilities and distance. ASM short range modems connect Computers, Terminals, Bridges, Routers and similar data communications devices inside buildings, campuses or within city boundaries. They support simple point to point communications or very complex multipoint campus-wide systems. Data Rates are up to 2 Mbps. SNMP management is available on most models. Link Interfaces are Twisted pair, Coax or Fiber. The ASM series is also available in a High Density Chassis system. Some of the electrical Interfaces they extend are:

- V.35
- V.36
- T1/E1
- RS-232
- RS-449
- T3/E3
- RS-530
- V.24
- G.703
- X.21
- RS-422
- Ethernet

ASMi-50

Equipment	Order Number
Due to the many options and configurations, please call your nearest Pulse office or email your requirements.	

SRM Rack Mount Chassis

ASM Rack Mount Chassis

ASM and HDSL Chassis

Fiber Optic Products

RAD data communications

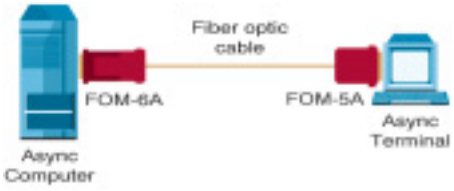
Extend Data, Voice and Video !

FOM Fiber Modem Series

The FOM line of fiber optic modems extends the range of data transmission beyond that of any other copper wire modem. Speeds up to 45Mbps are supported. The FOM Series extends the distances of:

- Async
- Sync
- T1/E1
- T3/E3
- V.35
- RS-232
- RS-530
- X.21
- V.36
- RS-449
- G.703
- Ethernet

FOM Series

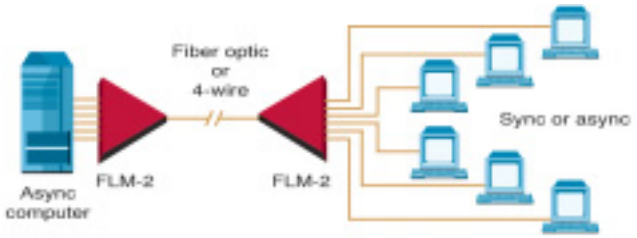


Equipment	Order Number
Due to the many ordering options and choices, please call your nearest Pulse office at tel: 888-785-7393 or email: mailus@pulsewan.com	

FLM Fiber Multiplexer Series

The FLM line of fiber optic Time Division Multiplexers enables up to 48 async terminals or workstations to be multiplexed onto a dual fiber optic cable. Synchronous transmission is available with the FLM-2.

FLM-2



Equipment	Order Number
FLM-1 6/12 Channel / ST	RFLM1SADFST115
FLM-2 6/12 Ch/sync / ST	RFLM2SADFST115
FLM-3 48 Channel / ST	RFLM3ST115
Call for more options.	

LRS-24 "Last Mile" SNMP Modem Rack

LRS - 24 is high-density SNMP managed modem hub. The chassis has 12 slots that accommodate up to 24 modems. Using modular interface cards LRS - 24 can support xDSL, fiber or baseband modems in the same chassis under a single management application.

The system supports different modem technologies and enables a wide range of data rates starting from 1.2 kbps in IDSL modems through 2 Mbps in HDSL modems, and up to 43 Mbps in fiber modems. These modem technologies enable ranges from 4.8 km at 2 Mbps over copper to 100 km over fiber optic cables.

All cards can be replaced, or cables removed, during operation, without causing interference to data transmission to/from other cards in the chassis.
Modular data interfaces allow modem connectivity using a wide range of data interfaces. These include V.24, V.35, X.21, RS-530, V.36, G.703 Codirectional, E1/T1, built-in Ethernet bridge (with or without VLAN support) and built-in IP router.
LRS-24 accepts a system clock via the DB-15 connector placed on the CM-2 card and distributes the clock to all cards.

LRS 24

Equipment	Order Number
Due to the complexity of this system and the many modular channel options for Data, LAN, Voice and Video, please call or email Pulse with your requirements	

RAD data communications

F-TEL Fiber Optic Phone Adapter

TF-TEL is a Fiber Optic Telephone Adapter providing direct, secure fiber optic connection between any telephone set and a PABX or between two telephone sets. F-TEL converts the electrical signals into optical signals. Two in-line units are required to complete a fiber link: a PABX unit (F-TEL/CO) for the PBX side and a Subscriber unit (F-TEL/SUB) for the subscriber telephone set. Extended operating range of up to 80.5 km / 50 miles with a laser diode is available. Options available for Single and Multi-Mode Fiber Cable. Supports both DTMF and pulse dialing

Low Cost Voice over Fiber !

F-TEL

Equipment		Order Number
F-TEL/SUB	Phone	RFTELSUB
F-TEL/CO	PABX	RFTELCO

Call or email Pulse for more options on this product.

FDSL-101

FDSL-101 Fiber Optic xDSL Extender

The FDSL-101 is an optical multiplexer grooming up to six DSL ports or five DSL ports and one E1/T1 port over a fiber optic cable, extending the reach up to 20 km (12.5 miles). The FDSL-101 is an optimal solution for grooming and extending the reach of routers, cross connects, PBXs and other devices equipped with SHDSL, ADSL, MSDSL or 2W-HDSL ports. Depending on the technology, typical DSL service extends up to 6 km (3.75 miles). As a result, there are potential customers beyond the reach of DSLAMs located in central offices. The FDSL-101 extends the DSLAM service while enabling the carrier to utilize existing DSLAM ports at its central site.

Two units are required, one on each side of the fiber optic line. Due to the transparency of the technology, service providers can migrate between different DSL technologies without changing FDSL-101 units in the CO and at the remote location. This simplifies the network, resulting in lower operating costs and higher service availability.

Equipment	Order Number

Call or email Pulse for ordering details on this product.

Optimux-4T1/4E1 and XLT1/E1 Fiber Multiplexers

The Optimux-4T1/4E1 is a multiplexer combining up to four T1/E1 channels over a single fiber optic link. The new Optimux XLT1/E1 provides Ethernet and up to 12 T1 or E1 channels with its modular (4) port chassis. A pair of Optimux-4T1 units offer simple and low-cost connectivity for four T1/E1 channels at distances up to 75 km.

Various optical interfaces are available:
850 nm for multimode fiber
1300 nm for single mode fiber
1300 nm LASER and 1550 nm LASER for extended range over single mode fiber

An optional second link provides backup using automatic switch-over upon link failure. An optional second power supply provides power redundancy and fail-safe operation. The Optimux-4T1/E1 transmits each of the T1/E1 channels independently, so that each T1/E1 channel can have a different clock.

Up to 12 T1/E1s over a Single Fiber !

Optimux-XL

Equipment	Order Number
Optimux-4T1 ST-850	ROP4T1/AC/ST85
Optimux-4T1 ST-1300	ROP4T1/AC/ST13
4-Port T1 Module - XL	OPXLM4T1
4-Port E1 Module -XL	OPXLM4E1

Many other options available for this product, including E1 and SMA Connectors. Call Pulse for assistance with these other options.

Fiber Optic Products

RAD data communications

FOMi-T3 and FOMi-E3 Intelligent Fiber Optic Modems

FOMi-E3 and FOMi-T3 are intelligent fiber-optic modems designed for the transmission of E3 (34.368 Mbps), T3 (44.736 Mbps) or HSSI signals over multimode and single mode fiber-optic media. The modems can be ordered with dual fiber-optic interfaces allowing full redundancy on the link transmission. A switchover mechanism is activated immediately upon detection of low optical levels on one of the dual optical links. Configuration, monitoring and diagnostics are performed via an ASCII terminal or an SNMP management station.

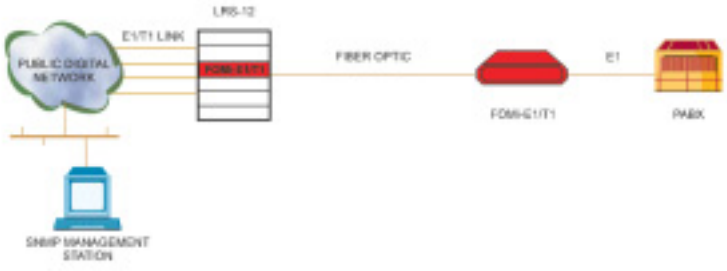
FOMi-T3 and FOMi-E3

Equipment	Order Number
FOMi-T3 ST-850nm	RFOMi-T3/AC/85ST
FOMi-E3 ST-850nm	RFOMi-E3/AC/85ST

Many other options are available for this product, including redundancy, single mode fiber and HSSI interfaces. Call Pulse for assistance with these other options.

FOMi-E1/T1 Intelligent Fiber Optic Modem

The FOMi-E1/T1 intelligent Fiber Optic modem provides extended range for E1 (2048 Mbps) or T1 (1544 Mbps) signals over fiber optic cable. Two versions of FOMi-E1/T1 are available: Master and Slave. The Master standalone version features a front panel LCD. The Slave unit has a blank front panel with a 20-pin connector. For cases where parameters of the slave or master unit have to be monitored or changed on the slave side, a Portable Control Unit (PCU) can be connected via the 20-pin connector (see Ordering).



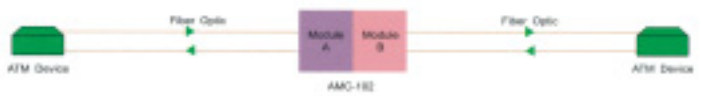
FOMi-E1/T1

Equipment	Order Number
FOMi-E1T1 Master ST-850nm	FOMi-E1T1/M/85ST
FOMi-E1T1 Slave ST-850nm	FOMi-E1T1/S/85ST
Portable Control Unit	RPCU

Many other options are available for this product, including rack mount cards and single mode fiber. Call Pulse for assistance with these other options.

AMC-102 Universal Media Converter

The AMC-102 is a high speed Media Converter which provides retimed conversion of optical and electrical signals at rates of 155 and 622 Mbps. The modularity of AMC-102 interfaces enables field changeable conversion between different media types. Protocols supported in retimed mode are 155 Mbps STM-1/OC-3, 155 Mbps STM-1/STS-3c over UTP and 622 Mbps STM-4/OC-12.



AMC-102

Equipment	Order Number
AMC-102 Chassis AC	RAMC-102/AC
AMC-102 Chassis DC	RAMC-102/DC

There are many electrical and optical interfaces from which to choose. Please contact your nearest Pulse office for assistance in ordering this product.
(see page 41 for a low speed version of this product)

ADTRAN

T3 Multiplexer over Fiber

OSU 300 Multiport Optical Service Unit

The ADTRAN® OSU 300 is a point-to-point fiber product that operates up to 44.2 Mbps, providing users up to four DTE data ports or 12 T1 ports. This multiport OSU provides access to private single mode fiber and allows users to share the bandwidth between multiple applications. The OSU 300 is the latest in a series of broadband access products from ADTRAN.

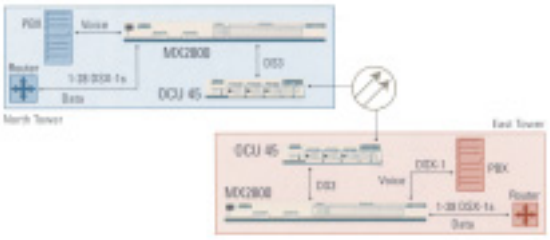
OSU 300

Equipment	Order Number
OSU 300 Base Unit	ADTN1200663L1
HSSI Expansion Module	ADTN1200218L1
V.35 Expansion Module	ADTN1200219L1
DSX-1 Module (4 port)	ADTN1200284L1

The OSU 300 has one HSSI (High Speed Serial Interface) port built into the chassis. Expansion slots for up to three additional DTE interfaces accept optional field-upgradable interface cards. The cards can be either HSSI, high-speed V.35, or DSX-1. The HSSI ports support rates from 75 kbps to 44.2 Mbps, while the high-speed V.35 ports support rates from 75 kbps to 10 Mbps, both in 75 kbps increments. Each DSX module has four DSX-1 interfaces and up to three DSX-1 modules can be supported in a chassis. The OSU 300 offers complete configuration, diagnostic, and performance monitoring through a VT 100 terminal, SNMP, or Telnet.

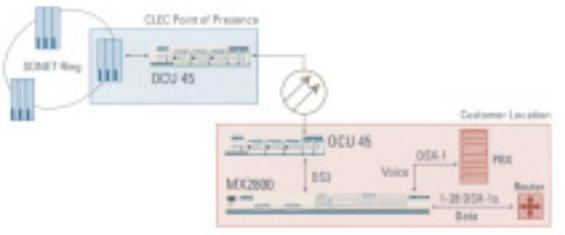
OCU 45 T3/E3/STS-1 Fiber MODEM

ADTRAN has applied its industry-leading carrier class expertise to the OCU 45, creating a product that meets the most stringent carrier class requirements. The OCU 45 offers transparent transport of T3/E3/STS-I services over a fiber transport, at distances up to 40km. The OCU 45 is available in singlemode and multimode versions. Measuring only one rack unit high the OCU 45 can be used standalone, wall mounted or mounted in 19-inch or 23-inch shelves, using an optional mounting tray. This compact device gives NSPs a convenient way to extend T3/E3/STS-I services from their point of presence to their customer and provides enterprise users a powerful tool for extendingT3/E3/STS-I services over fiber in a campus environment.



OCU 45

Configuration of the OCU 45 is accomplished through 2 switches on the front of the unit, which configure the metallic interface to T3, E3 or STS-I and sets metallic line length to short or long. The OCU 45 has both normally-open and normally-closed alarm relay contacts, with a front panel Alarm Cuttoff Switch. Diagnostics include metallic and optical loopbacks, initiated via a front panel switch. 3 LED's monitor the status of both the metallic and optical interfaces. The OCU 45 is DC powered from a -48 volt source. An optional AC to -48 Vdc converter is available to allow the OCU 45 to be AC powered.



Equipment	Order Number
OCU 45 Singlemode SC	ADTN1200664L1
OCU 45 Multimode ST	ADTN1200664L4
19” Mounting Tray	ADTN1200468L1
23” Extension Brackets	ADTN1200293L1
19” Vertical Mounting Bars	ADTN1200469L1
23” Vertical Mounting Bars	ADTN1200469L2

OPTI-3 OC-3 Multiplexer

The ADTRAN Total Access® OPTI-3™ sets a new mark for OC-3 multiplexers, delivering three DS3 circuits from a single OC-3 feed. Designed to meet the growing demand for DS3 deployment in today's economy, the Total Access OPTI-3 eliminates the need for expensive SONET multiplexer equipment in terminal mode applications and provides the fullest use of OC-3 capacity.

The Total Access OPTI-3 is interoperable with other SONET devices complying with GR-253 for easy deployment in new and existing SONET networks. A carrier-class device, the Total Access OPTI-3 meets the needs of applications that require extended temperature range operation such as remote terminals. The fully integrated design supports optional redundancy and is easily managed with support for TL1 commands over the Data Communications Channel (DCC). Additional management features include a local craft interface, remote alarm transport via DCC, and alarm reporting to legacy alarm systems. Front panel LEDs conveniently display status information.

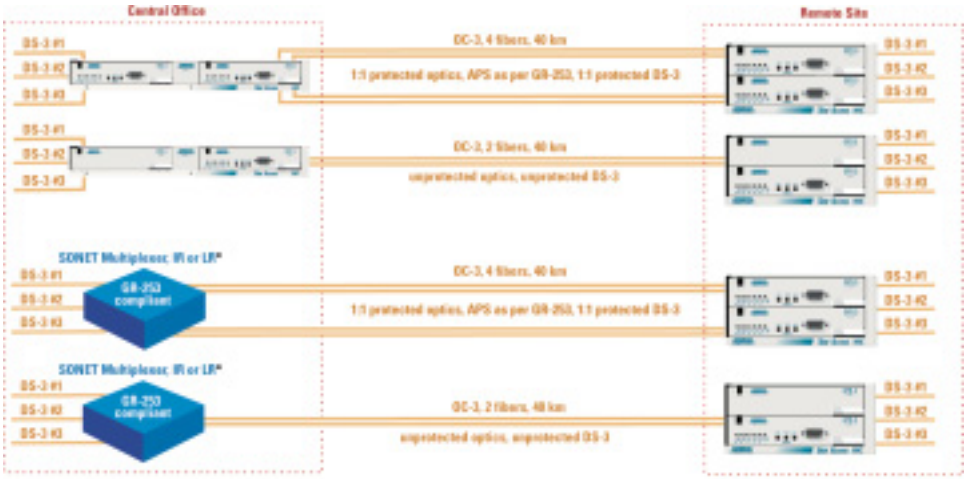
The unit requires only a fraction of the footprint normally needed for optical deployments. The Total Access OPTI-3 occupies standard slots in either a small two rack unit high wallmount chassis (WMC) or a space-saving one rack unit high rackmount chassis (RMC). The Total Access OPTI-3 can also be configured to operate redundantly with optional protection of the optics components. It can upgrade online from unprotected to protected.

The DS3 BNC coax connectors are located on the rear of the Total Access OPTI-3 chassis. This permits easy access to the customer side of the net-work for a convenient demarcation point, or to extend services to DS3 multiplexer applications. The fiber optics enter the chassis from the front of the unit and terminate on the card with a dual SC connector for simple installation. The unit provides for external auxiliary alarm inputs, and the RMC chassis provides additional alarm outputs for CO alarms.

OPTI-3 Wall Mount

OPTI-3 Rack Mount

Equipment	Order Number
OPTI-3 wallmount chassis	ADTN1184001L1
OPTI-3 card	ADTN1184002L3
OPTI-3 rackmount chassis	ADTN1184003L1
Bundles	
WMC OPTI-3 w/redundancy	ADTN4184001L1
RMC OPTI-3 w/redundancy	ADTN4184003L1
WMC OPTI-3 non-redundancy	ADTN4184001L2
RMC OPTI-3 non-redundancy	ADTN4184003L2
WMC OPTI-3 w/redundancy and battery backup	ADTN4184001L3


Central Office
Remote Site
DS-3 #1
DS-3 #2
DS-3 #3
OC-3, 4 fibers, 40 km
1:1 protected optics, APS as per GR-253, 1:1 protected DS-3
OC-3, 2 fibers, 40 km
unprotected optics, unprotected DS-3
SONET Multiplexer, IR or LR*
GR-253 compliant
OC-3, 4 fibers, 40 km
1:1 protected optics, APS as per GR-253, 1:1 protected DS-3
SONET Multiplexer, IR or LR*
GR-253 compliant
OC-3, 2 fibers, 40 km
unprotected optics, unprotected DS-3

Pulse supplies a complete line of speciality modems for demanding corporate and enterprise applications including:

- Leased Line
- -48vdc Powered
- 24vdc Powered
- Auto Dial and Backup
- Rackmounted
- Combined with ISDN
- Old Standards
- High Density
- OEM
- Cellular
- PCMCIA/Laptop
- Video and Voice

Give Pulse a call with any application or brand name in which you may be interested.
We are here to support you.

MultiTech Systems

MultiModemII™ Corporate Systems Modems

The full-featured MultiModemII corporate modem provides high-speed data and fax communications, a robust feature set, and an industrial chassis for rock-solid reliability. This modem is ideal for corporate users and legacy systems.

- ❑ Dial-up and 2-wire leased line support
- ❑ 4-wire leased line support and dial backup on some models
- ❑ U.S. Caller ID reporting
- ❑ Remote configuration for centralized setup and management
- ❑ DTMF tone detection and AS/400 settings
- ❑ Phone number storage for automatic or DTR dialing
- ❑ Flash memory for free firmware updates
- ❑ Synchronous and asynchronous support
- ❑ Data communications, fax, and other value-added software
- ❑ Five-year warranty

MT 5600

Equipment	Order Number
56K Modem (d/u,2wLL)	MT5600BA
56K Modem (d/u,2/4wLL)	MT5600BL
33.6K Modem (Dial-Up)	MT2834BA
33.6K Modem (Dial-Euro)	MT2834BAIe
33.6K Modem (Leased)	MT2834BL
33.6K Modem (Leased Intl)	MT2834BLI
33.6K Modem (Leased Euro)	MT2834BLIe

MultiModemZDX™ Corporate Desktop Modems

The affordable MultiModemZDX desktop modem delivers high-speed data transfers and faxing capabilities making it ideal for the mainstream PC- and Macintosh®-user market.

- ❑ V.90/56K or V.34/33.6K
- ❑ Class 1 (except MT2834 models) and Class 2 faxing at 14.4K
- ❑ Industry-standard error correction and data compression
- ❑ U.S. Caller ID reporting (except Legacy Models)
- ❑ Phone number storage
- ❑ Small footprint and stackable design
- ❑ Multi-language data/fax software for Windows
- ❑ Full-duplex speakerphone operation (voice model)
- ❑ Voice mail support (voice model)
- ❑ DTMF tone detection (voice model)
- ❑ Ten-year warranty

MultiModemZDX™

Equipment		Order Number
56K Data/Fax Modem	Global	MT5600ZDX
56K Data/Fax Modem	Europe	MT5600ZDXe
33.6K Data/Fax Modem	US	MT3334ZDX
56K Voice Modem	Global	MT5600ZDXV
56K Voice Modem	Europe	MT5600ZDXVe
33.6K Voice Modem	Global	MT3334ZDXV
33.6K Voice Modem	Europe	MT3334ZDXVe

MODEMs

This product has been discontinued by the manufacturer, but is still available new in limited quantities!!

Compaq 4000 Series

Series 4000 High Density Modem Chassis w/T1/E1/PRI / V.90
Compaq Microcom 4000 is a flexible modem platform. It allows you to cost-effectively upgrade to new modem technology without having to change your communication server infrastructure. Advanced features, high throughput and competitive pricing have made the Compaq Microcom 4000 a firm favorite with NT LAN managers, ISPs and bulletin board operators. Equipped with MODEMWARE™, Compaq's award-winning modem technology and hot swappable design, the 4000 series is the flexible network solution you can rely on.

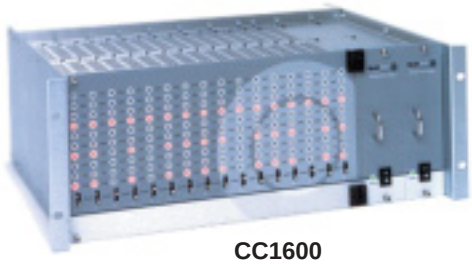
ISDN. NT. Modem flexibility.
Leave your options open. The 4000 series is designed for current and emerging standards. Install up to **64 x 33.6 modems or 112 x 56k** modems in a PRI/E1 environment. Compaq Microcom 4000 supports ISDN connections too and is ready to connect to a Windows NT LAN server. Offering easy conversion from individual analogue lines to PRI or channelised E1, the sophisticated 4000 series comes in a 19" rack mount housing and is only 7" tall.

Scalable. Future ready. Providing excellent value for money, the Compaq Microcom 4000 can be supplied with as few as four modems interfacing to analog lines. As the need for lines increases, modems can be added four at a time. The 4000 series also features Flash memory, so as operating protocols evolve – such as PRI or E1 – new firmware can be downloaded.

Equipment	Order Number
4000 Chassis	CMPQ348531001
4000 Power Supply	MCRO170100001
4000 Power Supply Int'l	MCRO170100B31
4000 Quad Modem/33.6	MCRO168400001
4000 Quad Adapter	MCRO168450001
4000 Eight Modem/56k	MCRO166550B21
4000 Eight Adapter	MCRO168500B21
4000 T1/PR1 Card	MCRO167500B21
4000 E1/PR1 Card	MCRO170050B21

We have a complete line of standard cables for connecting to standard Routers, Remote Access Servers and Modems.

MultiTech Systems



CC1600

CC1600 Series Rackmount Modem and DSU System
The scalable CC1600-Series rackmountable card cage consolidates up to 16 V.34/33.6K modem cards for dial-up, 2-wire, or 4-wire leased line service or 56K DSU cards. This system is ideal for businesses that want to provide dial-in remote access, dial-in/dial-out faxing, or point-to-point connectivity with branch offices.

- ❑ Easily scaled capacity to accommodate increased load/usage
- ❑ Rackmount chassis supports up to 16 V.34/33.6K modem or 56K DSU cards
- ❑ Hot-swappable, dual redundant power supplies
- ❑ Multi-Tech Class 2 faxing at 14.4K in the modems
- ❑ Industry-standard error correction and data compression
- ❑ BLR modems support 4-wire leased line and dial backup
- ❑ Modems support callback security, DTMF tone detection, and remote configuration
- ❑ Flash memory on modems for firmware updates
- ❑ Hot-swappable modem and DSU cards
- ❑ Two-year warranty

Equipment	Order Number
RJ-11 Chassis (Dial-Up)	CC1600-11L
RJ-11 V.34 Chassis (Dial-Up)	CC1628-11L
RJ-11 Chassis (Dial-Up) DC	CC1600-11L48
RJ-11 V.34 Chassis (Dial-Up) DC	CC1628-11L48
RJ-21 Chassis (Leased)	CC1600-21
RJ-21 V.34 Chassis (Leased)	CC1628-21
RJ-21 Chassis (Leased) DC	CC1600-2148
RJ-21 V.34 Chassis (Leased)	CC1628-2148
Second 90-260v AC Power Supply	MTPS1600
Second -48 VDC Power Supply	MTPS1648
33.6 Rack Modem (d/u,2wLL)	MT2834BR
33.6 Rack Modem (d/u,2/4wLL)	MT2834BLR
33.6 (as above) International	MT2834BLRI

Encore Networks™

Solve T1/E1 Signaling Problems !

TSC-100 Trunk Signaling Converter for T1/E1

The TSC-100 is an advanced protocol/signaling converter system that provides connectivity between incompatible switches or network components. With it's full support of both protocol and rate conversion the TSC-100 is one of the premier solutions for meeting a range of interoperability challenges stemming from incompatible telecommunications components. An extensive protocol list that features support in over 70 countries ensures system reliability and global support.

TSC 100

Equipment	Order Number
TSC-100	TSC-100

ANSI SS7, ITU-T C7, and Primary Rate ISDN are available on the Signalpath system, pages 39-40.

Due to the many options, please call or email your nearest Pulse office.

Flexible System and Configuration Options

A number of features make the TSC-100 highly adaptable to your specific protocol needs. The TSC-100 supports multiple signaling protocols including R1, R2, DTMF, C5, DECADIC, and is easily configured for custom protocols. The system's modular construction lets you expand system capacity to as many as 15 T1 or 12 E1 trunks, with each module holding one T1 or one E1 line. The system provides dual operation of T1 and/or E1 interfaces. It can be configured as a rate converter and permits cross mapping of E1 channels to T1 trunks without loss of channels. It also supports a number of interface options: T1 to T1, T1 to E1, E1 to T1, and E1 to E1, all of which are user configurable for framing and signaling parameters. Configuration is easy: a user-friendly configurable menu allows you to select functionality, country protocols, and provisioning of the system. The system is available with 115v, 230v or 48vdc power

VALIANT COMMUNICATIONS LIMITED

VCL-GSM Channel Bank

The VCL-GSM™ is a converter from E1 or T1 directly to standard GSM operating in the 900, 1800 or 1900mhz band. The system is available with Single SIM per channel or 3 SIMs per channel with intelligent SIM rotation and load balancing

Standard 19" rackmount chassis supports up to 24 or 30 voice channels. AC or DC powered. Uses Standard 3v SIM cards. Optional accessories are IP access for telnet management and Echo Cancellation. The VCL-GSM is perfect for termination of E1/T1 VoIP gateways to GSM mobile networks (see Quintum Tenor) Rid yourself of the clutter single standalone units create and have centralized managment/control.

VCL-GSM

Equipment	Order Number
T1 24 Port System	GSM-T1-24
E1 30 Port System	GSM-E1-30
T1 24 Port System TRI-SIM	GSM-T1-24-3
E1 30 Port System TRI-SIM	GSM-E1-30-3
Ethernet mgt option	GSM-IP-MGT
Echo Canceller chassis card	GSM-EC

Due to the many options call or email Pulse for more options.

Interface and Signaling Conversion

Connect Your ISDN PBX to the R2 Public Network Inexpensively!

R2Adapter™

The R2Adapter™ is a line of signaling adapter appliances designed for fast, easy, low-cost integration into carrier networks and vendor equipment. Using existing technology based on the proven FastComm SignalPath™ 201 Signaling Gateway, the R2Adapters allow traditional IP PBX vendors to penetrate international markets where the need for protocol conversion between disparate networks is greatest. The R2Adapter is equipped to handle multiple country-specific R2 variants world wide by enabling interoperability between PTT and carrier R2 networks and the ETSI ISDN trunk interfaces on the customers' equipment.

Simple to use, quick to deploy, the small footprint R2Adapter is capable of carrying traffic over a single E1 trunk. The R2Adapter is particularly attractive to vendors who are planning on boosting their revenues by introducing new products into countries such as Mexico, Colombia, Brazil, Argentina, Costa Rica, Venezuela, Paraguay, Uruguay, China, Vietnam, Cambodia, Indonesia, Malaysia, Thailand, Singapore, Philippines, Israel, New Zealand, Korea, Greece, Kuwait, and others.

One country can have up to six or seven different variants of R2 simultaneously in use within its networks. The R2Adapter breaks down the communication barriers presented by these different protocols and adapts the flow of information across any network.

The R2Adapter features a compact 1U height designed for budgeted space, with a streamlined capacity of one E1 interface for fast, easy deployment.

R2Adapter™

Equipment	Order Number
R2Adapter AC Power	R2Adapter-AC
R2Adapter DC Power	R2Adapter-DC

See SignalPath 201 and SignalPath 230 for more CCS signaling solutions (page 40).

SignalPath™ 201-SA Universal Signaling Adapter

The SP201-SA, a member of the SignalPath™ Signaling Gateway product line, addresses the need for a low-cost product that is universally compatible with most enterprise and customer premise PBXs, IP-PBXs, IP video conferencing, media gateways, and multi-service access devices. The compact SP201-SA desktop unit, which supports CAS (R1, R2, DTMF) and ETSI and NI2 ISDN, is capable of carrying traffic over T1/E1 trunks via standard BNC or RJ48 connections.

The SP201-SA was developed as a PBX solution for both carrier and enterprise customers. With its low cost, expanded feature set, and small footprint, the SP201-SA will attract the business of enterprise Customer Premises Equipment (CPE) vendors who want to establish ISDN to legacy protocol network connections in regions they are currently unable to service due to deficiencies in their networks' signaling capabilities.

SP-201SA

(rear)

Equipment	Order Number
SignalPath 201-SA 2 port	SP-201-SA-2
SignalPath 201-SA 4 port	SP-201-SA-4

Please contact your nearest Pulse office for ordering details.

Encore Networks™

SignalPath 201

SignalPath™ 230 Protocol Signaling Gateway

The SignalPath 230 (SP230) is an advanced signaling protocol converter designed to facilitate interoperability between incompatible communication networks. The SP230 enables a seamless interface between in-band and out-of-band networks, and between out-of-band networks and other out-of-band networks. Different types of communication protocols, both in-band and out-of-band, exist globally. One country could have up to six or seven different protocols simultaneously in use within its networks. The SP230 breaks down the communication barriers presented by these different protocols and enables the flow of information across any network.

Not only can you increase your potential to connect to a larger portion of the world market, but you can also eliminate charges you may be currently paying to one or more companies for network connections. This means more revenue in your corporate pocket.

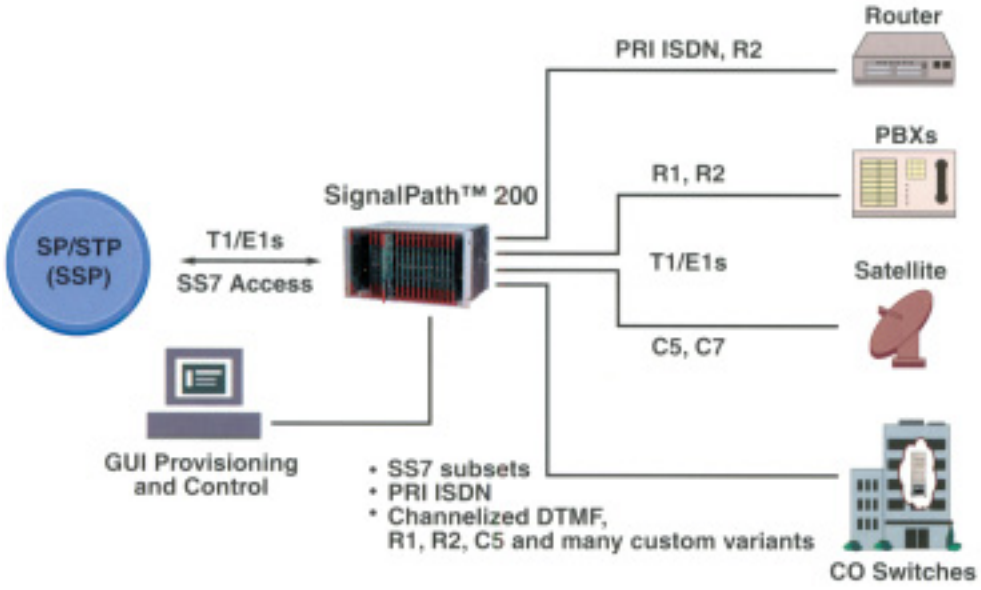
The SP230 has a modular design, with a capacity of up to 52 E1 or T1 interfaces, allowing users to scale the product to fit small or large applications while incurring a low upfront investment. In-band protocols supported are R1, R2, and DTMF. Out-of-band protocols supported are SS7-ANSI, C7-ITU-T, and NI2 and ETSI PRI-ISDN. Custom variants of both in-band and out-of-band protocols are available.

The SP201 is a fixed configuration version of the SP230. It supports a maximum of four T1/E1 trunks (8 ports) with a single signaling link.

SignalPath 230

Equipment	Order Number
SignalPath 230	
SignalPath 201	

Due to the complexity of this product and the many options, please call or email your nearest Pulse office for ordering assistance.

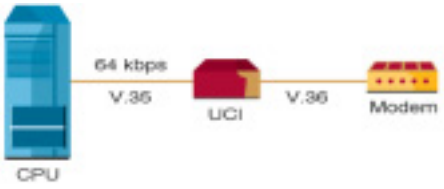


RAD data communications

MIC and UCI Interface Converter Series

The MIC and UCI Interface Conversion products allow the connection between DTE and DCE communications equipment with different Interfaces. They provide both the physical and electrical conversion between the two interfaces. The UCI also provides modem elimination and elastic buffering. Interfaces supported:

- V.35
- V.36
- RS-232
- RS-449
- RS-530
- G.703
- X.21
- V.24



MIC 24/35

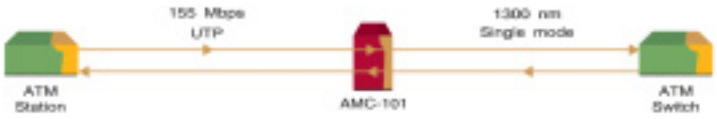
UCI

Equipment	Order Number
MIC- RS232-V35 converter	RMIC2435F
MIC- RS530-V.35 converter	RMICT35C
MIC- RS232-RS422 converter	RMIC2436
MIC- RS232-Current Loop	RMIC24CL
MIC- X.21-V.35 converter	RMICX2135
MIC- V.11-RS232 converter	RMICV1124
MIC- RS-485-RS232 converter	RMIC48524

Many more options and electrical interfaces are available, please call or email your nearest Pulse office.

AMC-101 Universal Media Converter and Repeater

The AMC-101, Universal Media Converter, provides retimed or transparent conversion of optical and electrical signals for ATM, FDDI, Fast Ethernet and other protocols at data rates up to 155 Mbps. The modularity of the AMC-101 interfaces enables field changeable conversion between any two media. The AMC-101 provides retimed media conversion for the following ATM interfaces: STS-1 (51 Mbps), TAXI (100 Mbps) and STM-1/STS-3C (155 Mbps) over optical and electrical interfaces. Retimed conversion is also available for FDDI and Fast Ethernet (100 Mbps). A single AMC-101 can be used as a fiber optic or copper repeater for ATM or FDDI and Fast Ethernet, when installed with two similar retimed modules.



AMC-101

Equipment	Order Number
AMC-101 Base Chassis	RAMC101AC
UTP Module 155mbps	RAMCMUTP155
FIber Module multimode	RAMCMMST85T

Due to the many options, please call or email your nearest Pulse office.

SPD-T1 and SPD-E1 (T1/E1) Rate and Interface Converters

The SPD-T1 and SPD-E1 are rate and interface converters, enabling conversion between T1 and E1 framing. This enables T1 equipment to operate over E1 facilities and E1 equipment to operate over T1 facilities.

SPD-T1

SPD-E1

Equipment	Order Number
SPD-T1 T1-E1	RSPDT1115
SPD-E1 E1-T1	RSPDE1115

Due to the many options call or email Pulse for more options.

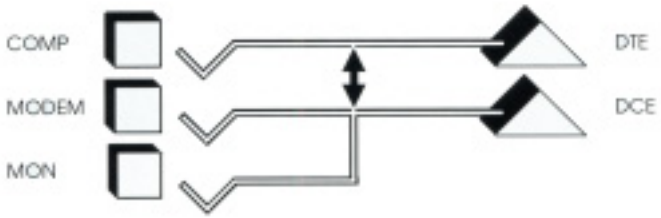
Digital Patch Panels

Pulse offers a complete line of digital switching and patching products. Patching solutions providing non-intrusive monitoring and patching into data circuits are available for all popular serial interfaces, with speeds up to 10Mbps supported.

These systems provide both an efficient and a reliable means of accessing data circuits for network reconfiguration, service restoral, non-interruptive line monitoring and troubleshooting.

Standard Patch systems are rack mountable. Each rack has 17 slots for Patch, Access, and Test Modules. Each Patch Module has three front-panel patch cavities (COMP, MODEM, and MON) for access to the circuit and two rear connectors (DTE and DCE) for attachment to communication equipment.

When no patch cords are inserted, the circuit between the DTE and DCE is normal through. Inserting a patch cord in the COMP cavity breaks all 18 (V.35) or all 24 leads of the circuit and provides access to these leads toward the DTE. In the MODEM cavity, the circuit is accessed toward the DCE. The MON cavity provides access without breaking the circuit.



Switch and **Switch/Patch** systems are also available to provide A/B circuit switching and a combination of A/B circuit switching and patching.

Matrix Switching systems provide maximum flexibility for real time circuit reconfiguration and monitoring. Systems are available for T1, E1, V.35, RS-530, RS-449 and RS-232. Matrix Switching products allow the user to switch any port to any port (full non-blocking matrix). Systems are computer controlled and can be accessed remotely to provide off site access to circuit maintenance and reconfiguration.

Equipment	Order Number
RS-232 Patch System	Please Call
RS-530 Patch System	
RS-449 Patch System	
V.35 Patch System	
X.21 Patch System	
(X.21 also supports T1/E1, DB15 Interface)	
RJ-45 8-Wire Patch System	
RJ-45 4-Wire Patch System	
RJ-45 8-Wire Switch	
RS-232 SwitchPatch System	
V.35 SwitchPatch System	
RS-530 SwitchPatch System	
T1/E1 Matrix Switch	
V.35 Matrix Switch	
RS-232 Matrix Switch	
RS-530 Matrix Switch	

Due to the complexity of these products and the many options, please call or email your nearest Pulse office for ordering assistance.

Spectron Compatible Systems and Cables Still Available!

Frame Relay and X.25

RAD data communications

Frame Relay and X.25 !

SPS-6/12 Frame Relay/X.25 Switch

The SPS-6 and SPS-12, Multi protocol Packet Switches, are high performance, X.25/Frame Relay Switches for routing between X.25/Frame Relay access units. The SPS-6 can switch up to six synchronous links and the SPS-12 up to twelve synchronous links. Two Asynchronous channels are available with each model.

SPS-6 & SPS-12

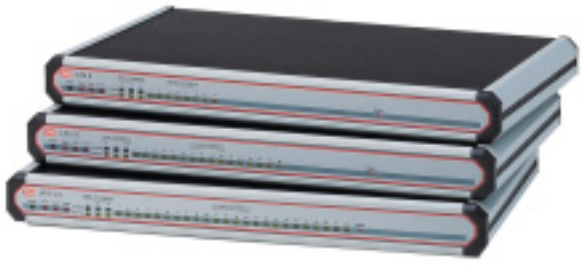
Equipment		Order Number
SPS-6	Base Chassis	RSPS6X
SPS-12	Base Chassis	RSPS12X
SPS-V24	RS-232 module	RSPSMV24
SPS-V35	V35 module	RSPSMV35
SPS-530	RS-530 module	RSPSM530
SPS-X21	X.21 module	RSPSMX21

APS 8-16-24 Multiprotocol X.25/Frame Relay PAD/FRAD/Switch

APS-8, APS-16 and APS-24 are high performance FRAD / X.25 PADs for access to Frame Relay / X.25 networks. The number of async channels is expandable up to 72, via external statistical multiplexers. All models have three synchronous links, which also function as a multiprotocol packet switch.

Each of the three switch ports can be programmed to operate with transparent HDLC for connecting bridges, routers and other HDLC communication devices over X.25 or Frame Relay networks. The HDLC protocol is encapsulated over X.25 or Frame Relay, providing end-to-end transparent operation. All async channels can act according to X.3, X.28 and X.29 profiles at traffic speeds of up to 115.2 kbps. Async traffic can be packetized directly over a Frame Relay network, or packetized over the X.25 network. All channels are configured and monitored by the management agent of APS-8, APS-16 and APS-24.

IP datagrams can be routed over Ethernet, PPP or SLIP links and over Frame Relay networks (according to RFC 1490) or over an X.25 network (according to RFC 1356). APS-8, APS-16 and APS-24 support RIP1, RIP2 and triggered acknowledgment RIP messages (according to RFC 1058, 1723 and 1724). The RIP support enables easy IP connection while minimizing IP user configuration. The triggered RIP enables reduction of the overhead associated with the RIP mechanism, by minimizing the number of periodic messages sent. Static IP routing is supported. IP packets are routed to destination via SLIP, PPP, LAN (Ethernet), X.25 or Frame Relay link, according to the IP address.



APS 8-16-24

Equipment		Order Number
APS-8	Base Chassis	RASPS6X
APS-16	Base Chassis	RAPS12X
APS-24	RS-232 module	RAPSMV24
APS-UTP	Ethernet module	RAPSMUTP
APS-DDS	DDS DSU	RAPSMDDS
APS-V24	V.24 module	RAPSMV24
APS-V35	V35 module	RAPSMV35
APS-530	RS-530 module	RAPSM530
APS-X21	X.21 module	RAPSMX21

APD-8 X.25 PAD/FRAD

APD-8 provides access to public or private Frame Relay networks. Async data is sent directly over the Frame Relay or encapsulated over X.25 / Frame Relay (Annex G), to achieve maximum reliability.

All async channels can act according to X.3, X.28 and X.29 profiles, at traffic speeds of up to 115.2 kbps. Async traffic can be packetized directly over Frame Relay network, or packetized over the X.25 network. All channels are configured and monitored by the management agent of APD-8.

APD-8 contains an SNMP agent, which enables remote configuration, collection of statistics / status reports, and diagnostics. The management agent can be programmed to periodically send statistics / status reports to a maximum five management stations.

APD-8

Equipment	Order Number
8 PORT X25 FRAD/PAD DDS	APD-8/AC/DDS
8 PORT X25 FRAD/PAD V.24 DTE	APD-8/AC/V24
8 PORT X25 FRAD/PAD V.35 DTE	APD-8/AC/V35
8 PORT X25 FRAD/PAD ETH	APD-8/AC/UTP

ADTRAN

Express 5000 Series

The Express 5000 Series of remote access devices supports Frame Relay connectivity for employees working from branch locations, home offices, and other remote site locations. The Express 5110 is a Frame Relay Access Device (FRAD) supporting legacy protocols and LANs with a built-in 56/64K DSU/CSU and two data ports. The Express 5200 Series includes the same features as the Express 5110 and adds support for voice and dial backup. The Express 5210 has a single data port and adds a 10BaseT Ethernet port and built-in IP router for full-featured Frame Relay access.

As Frame Relay continues to experience growth, it is becoming necessary to enhance network reliability for critical sites. Safe-T-Net is ADTRAN's technology that provides dial backup for network recovery of Frame Relay traffic. Safe-T-Net is supported in ATLAS, IQ, and Express 5200 Series products.

Express 5110

Express 5210

Equipment	Order Number
Express 5110	ADTN1202130L2
Express 5200	ADTN1202175L1
Express 5210	ADTN1200208L1
Express 5210 FT1 Bundle	ADTN4200208L1
Quad FXS Module (Express 5210)	ADTN1200653L1
Dual FXO Module	ADTN1202187L1
Dual FXS Module	ADTN1202188L1
Dual E&M Module	ADTN1202189L1

ATLAS 830

The ATLAS 830 includes an IP router and support for PPP applications. Voice over Frame Relay (VoFR) is supported using one or more of the optional Voice Compression Modules to deliver high quality voice among Frame Relay sites. The ATLAS 830 can be configured to transport voice and data traffic within a single PVC, reducing monthly expenses. An ATLAS 830 can be optioned to transport up to 64 compressed voice connections over a Frame Relay network.

ATLAS 830

ATLAS 550

ATLAS 550 supports multiple network technologies including T1/FT1 DSX-1, ISDN, FXS, FXO, V.35 and 10/100 Ethernet and is designed to be used for more cost-effective T1, ISDN or Frame Relay networks. With the modularity of ATLAS 550, users can now support up to 10 FT1s and run traditional switched or multi-plexed voice/data traffic, ISDN, or packetized Frame Relay. Users can also run a hybrid mix of network architectures that will make it easier to evolve network systems and applications. For example, using intelligent call routing and an optional voice compression module, users can simultaneously support toll grade voice calls and compressed voice over Frame Relay, all dynamically switched between PBXs, key systems, and the public network.

ATLAS 550

Equipment	Order Number

See pages 5 and 6 for complete ordering information

ISDN Products

ISU 128 ISDN Terminal Adapter

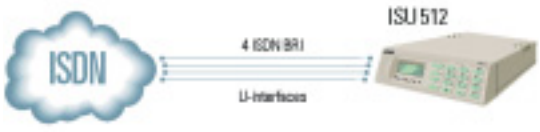
The ADTRAN ISU 128 is a standalone ISDN service unit that connects data terminal equipment to the ISDN network. The ISU 128 includes NT1 network termination and terminal adapter functionality. The unit can be viewed as an ISDN modem that is well suited for LAN/WAN connectivity and other applications where large data transfers are necessary at high speed rates up to 128 kbps. Synchronous data transfer rates from 2400 bps to 128 kbps and asynchronous rates from 300 bps to 115.2 kbps are supported through a V.35, EIA-232 or RS-530 interface.

ISU 128

Equipment	Order Number
ISU 128	ADTN1202029L2
ISU 128 Rackmount	ADTN1200087L1

ISU 512 ISDN Inverse Multiplexer

The ADTRAN ISU 512 is a standalone ISDN Service Unit that connects data terminal equipment (DTE) to the ISDN network. The ISU 512 is specifically designed as a low-cost solution for applications such as video-conferencing, T1 backup, LAN/WAN connectivity, and high-speed file transfer. The ISU 512 may utilize either the V.35 or RS-530 DTE interface and supports synchronous data rates from 56 kbps to 512 kbps. At rates over 64 kbps, the BONDING Mode 1 inverse multiplexing protocol synchronizes data using from one to eight 64 kbps B channels. By supporting BONDING the ISU 512 interoperates with other BONDING-compatible inverse multiplexers and ISDN terminal adapters.

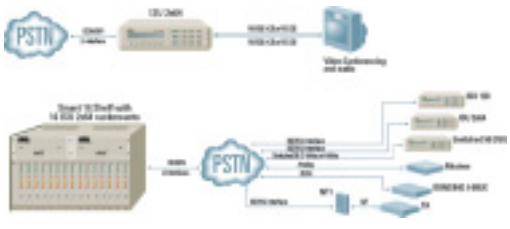


ISU 512

Equipment		Order Number
ISU 512	U Interface	ADTN1202086L1
ISU 512	With Cables	ADTN4202086L1
ISU 512e	Ethernet Port	ADTN1203086L1
ISU 512 ST	Universal Power	ADTN1202086L2
ISU 512 ST	With Cable	ADTN4202086L2

ISU 2X64 Dual Port Terminal Adapter

The ISU 2x64 is a dual port version of the ISU 128. It is available with or without an integrated NT1. The ISU 2x64 can be viewed as a dual ISDN modem that simultaneously and independently supports two applications at up to 64 kbps on each DTE interface. The ISU 2x64 is ideal for video and audio transmission as well as a cost-effective modem replacement. The ISU 2x64 provides dual RS 530/EIA-232 DTE interfaces. An RS-530-to-V.35 adapter is available to support V.35 DTE interfaces. Synchronous data transfer rates from 2400 bps to 64 kbps and asynchronous rates from 300 bps to 57.6 kbps are supported when using dual DTE interfaces.



ISU 2X64 (Back)

Equipment		Order Number
ISU 2X64	U-Interface	ADTN1200051L1
ISU 2X64	S/T-Interface/220V	ADTN1200051L6
ISU 2X64 With Cables		ADTN4200051L1
RS-530 to V35 Adapter Cable		ADTN1200072L1
Rack Mount Versions:		
ISU 2X64	Card /U-Interface	ADTN1200051L1

Express 3000 Series ISDN Teminal Adapter

- Asynchronous and synchronous RS-232 interface
- Expert ISDN automatic SPID and switch detection
- Two analog POTS ports
- Place and receive phone calls while transmitting data
- Hi/fn LZS compression
- Supports custom calling features and Caller ID
- Remote configuration
- Easy configuration via AT commands or VT 100
- Flash upgradable
- Standard 5-year warranty

Express Series

Equipment	Order Number
Express 3000 Async	ADTN1203153L2
Express 3010 Sync/Async	ADTN1200239L1

NT1 Termination Devices for ISDN

The NT1 ACE series provides the user with one, three or four ISDN U-interfaces, converting these interfaces to one, three or four S/T interfaces for connection to Data Terminal Equipment (DTE). The NT1 ACE3 and NT1 ACE4 are ideal for 384 or 512kbps videoconferencing applications. The NT1 T400 Circuit Pack is ideal for high-density central site solutions.

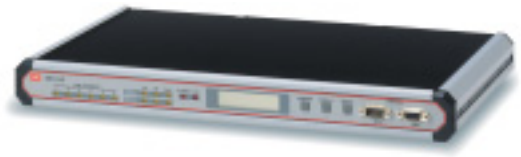
The ISDN Basic Rate 2-wire U-interface must be terminated at the customer premises to provide the necessary 4-wire S/T-interface to terminal adapters. Some terminal equipment such as ISDN voice and data phones, computer terminals, terminal adapters, desktop videoconferencing systems, etc., require the 4-wire S/T-interface. ADTRAN NT1s support the ANSI 2B1Q line coding and multiple switch vendors including AT&T, NEC, Northern Telecom, and Siemens. ADTRAN NT1s accommodate a single or triple Basic Rate U-interface(s) input and provide 4-wire S/T outputs. The NT1 Ace is a small desktop unit. The NT1 400 is a durable metal enclosed version for wallmount or Rackmount in the Nt1 400 Shelf.

NT1 ACE

Equipment	Order Number
NT1 ACE	ADTN1203019L1
NT1 ACE3	ADTN1200236L1
NT1 ACE4	ADTN1200242L1 NT1 400 Standalone ADTN1210016L1
NT1 400 Rackmount	ADTN1210010
NT1 400 Chassis / 12 slot /19”	ADTN1150028L1
NT1 400 Chassis / 12 slot /23”	ADTN1150024L1
NT1 400 Chassis AC PS/ 115v	ADTNPOWERAC
NT1 400 Chassis DC PS/ -48v	ADTNPOWERDC

IMX-64 ISDN Inverse Multiplexer

The IMX-64 inverse multiplexer supports up to six network channels (via three or four physical network ports) and one or two data ports. The IMX-64 splits the bandwidth of its data ports over some or all of the networks channels in order to provide the required bandwidth for the application connected to the data ports. Typical applications for IMX-64 include high speed leased line backup, Bandwidth On Demand and Dynamic Bandwidth Allocation.



IMX-64

Equipment	Order Number
IMX-64 1 Data, 3 ISDN	RIMX64BV35IBE
IMX-64 2 Data, 2 ISDN	RIIMX64CV35IBE

Contact Pulse for more ordering options.

ATM Access

ACE-2002 and 2002E Access Concentrator/ATM Termination Unit

The ACE-2002 can be used as a carrier-owned demarcation device or as a corporate concentrator connected to the public ATM network.

The ACE-2002E is an enhanced version of the ACE-2002 that can accommodate additional E1/T1 interfaces. Information about ACE-2002 also pertains to ACE-2002E unless otherwise specified.

As a demarcation device, the ACE-2002 enables carriers and service providers to define the boundary between their ATM-based public services and the customer private network (customer-located equipment - CLE). A clear demarcation point at the customer premises increases the service reliability, improves network efficiency and ensures end-to-end QoS support. The ACE-2002 can be used for a combination of legacy services such as voice, LAN, Frame Relay, HDLC and ATM, or as a demarcation device for native ATM traffic.

The ACE-2002 has built-in features that enable the extension of ATM network facilities up to the customer premises. These features support various ATM services, such as advanced traffic management (policing, scheduling and shaping) and full I.610 OAM (Operation, Administration and Maintenance) flow support. In addition, the wide range of ATM modules further enhances the flexibility of service offerings. When used as an interworking device, the ACE-2002 enables smooth migration of legacy equipment such as PBXs and routers operating over ATM networks. Using multiport modules and three user slots, the ACE-2002 can be used as a concentrator for medium to large corporations. The unit enables the most efficient utilization of public ATM services for transporting different types of corporate traffic, including ATM.

To enhance carriers' service offerings, ACE-2002 supports VP tunneling. This enables bundling multiple VCCs into a single VPC while maintaining all the VCC QoS characteristics and I.610 OAM capabilities at F4 and F5 layers. Each tunnel can be shaped as a CBR connection. It can be defined with end-to-end OAM flows and act as a regular VP connection in the public network. Traffic ManagementBoth users and network operators benefit from spacing bursty traffic. For the user, more traffic can pass through the link at no additional cost. For the operator, spacing enables better statistical efficiency while keeping the same backbone equipment and QoS. ACE-2002 offers a built-in mechanism that supports up to 983 spaced connections.

In order to improve service resilience, ACE-2002 offers a protection mechanism on the user and network sides, which enables standard SDH/SONET protection of the last physical segment from the service exchange to the customer premises. ACE-2002E can combine up to 20 E1/T1 IMA/UNI ports or up to 20 E1/T1 CES ports. The high E1/T1 port density is especially suitable for cellular applications.

ACE-2002 can be equipped with multiple LAN modules (up to six LAN ports in the ACE-2002E). The LAN module performs bridging and routing (RFC 1483/2684) with IP ToS and 802.1D priority support. In addition, multiple VLANs can be configured, optimizing ACE-2002 for LAN and IP access applications.

ACE 2002

ACE 2002E

The ACE-2002 comes in a 1U high enclosure suitable for mounting in a 19" rack. The ACE-2002E is 1.5U high.

Equipment	Order Number
ACE 2002 DC Chassis	ACE-2002/48
ACE 2002E DC Chassis	ACE-2002E/48
ACE 2002 AC Chassis	ACE-2002/AC
ACE 2002E AC Chassis	ACE-2002E/AC
4xT1 Module	M/CES/4T1
Ethernet Module	M/ETH
Ethernet + E1 Module	M/ETH/CES/E1
Ethernet + T3 Module	M/ETH/CEST3
OC-3 Module	M/SC13L/155
T1 Module	M/T1
T3 Module	M/T3

RAD data communications

ACE-101 ATM Network Termination Unit

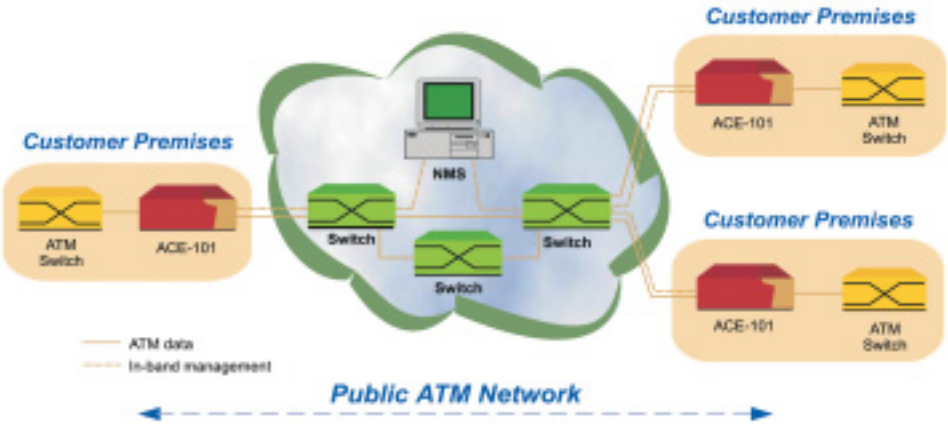
ACE-101 can be used as an ATM NTU (Network termination Unit) for native ATM or as a multiservice access concentrator (MSAC). Located at the customer premises, it can be controlled by an ATM service provider, or it can be used as part of a corporate ATM-based WAN.

As an A-NTU, ACE-101 enables a smooth and flexible connectivity between user network and public network. It allows carriers to guarantee the Quality of Service (QoS), by collecting and measuring localized and segment parameters. Thus, detailed performance information and end-to-end network control are provided.

As a multi-service access concentrator, ACE-101 offers ATM QoS-based WAN services. Traditional services, such as LAN and voice, can be consolidated over statistically multiplexed links, at high rates. The built-in traffic management features contribute to the efficiency and quality of these services.

ACE-101

Equipment	Order Number
ACE-101 DC Chassis	ACE-101/48
ACE-101 DC Chassis Dual pwr	ACE-101/48/R
ACE-101 AC Chassis	ACE-101/AC
ACE-101 AC Chassis Dual pwr	ACE-101/AC/R
HDLC 4xV35 Module	ACE-101M/4HDLC/V35
4 Port E1 Module	ACE-101M/CES/4E1
4 Port T1 Module	ACE-101M/CES/4T1
155MBPS G703 BNC	ACE-101M/CX/BNC/155
4 E1 IMA	ACE-101M/IMA/4E1
4 T1 IMA	ACE-101M/IMA/4T1



ARC-101 ATM Rate and Media Converter

ARC-101, ATM rate and media converter, provides transparent rate and media conversion between two ATM interfaces by extracting ATM cells from one interface and sending them over the second one.

ARC-101 connects devices with dissimilar ATM interfaces. Alternatively, ARC-101 can be used in ATM testing environments, enabling module interchangeability according to devices being tested.

ARC-101 supports a wide variety of ATM data rates and media types. These include: E1, E3, T3 and STS-3c/STM-1 over optical and electrical interfaces.

ARC-101

Equipment	Order Number
ARC-101 DC Chassis	ARC-101/48
ARC-101 AC Chassis	ARC-101/AC
COAX 155Mbps Module	ARC-M/CX/BNC/155
E1 Module	ARC-M/E1
E3 Module	ARC-M/E3
T3 Module	ARC-M/T3
UTP 155Mbps Module	ARC-M/UTP/155
Fiber Module	ARC-M/ST13S/155

RAD data communications

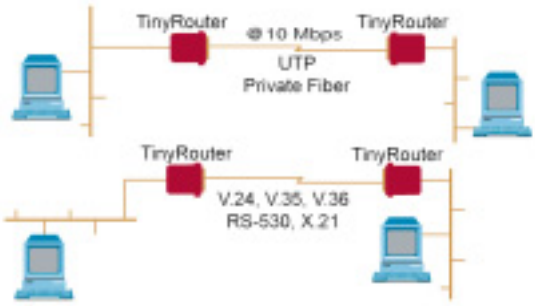
WEB RANger-II Entry Level Routers

WEB RANger-II is a compact access router that connects a small to medium-size network to the Internet or private services, utilizing Frame Relay, E1/T1 or synchronous services. IP and IPX routing and standard bridging are implemented opposite any third-party router. One or two Ethernet interfaces are supported (10Base2 or 10BaseT). WEB RANger-II allows branch offices to integrate routed LAN traffic and voice from a PBX over a single E1/T1 connection to company headquarters. Similarly, it allows service providers to offer both IP services and Fractional E1/T1 connection to the PBX over a single E1/T1 or Fractional E1/T1 connection. The single IP address translation feature allows a small or medium-size office LAN to connect to the Internet using a single, dynamically or statically allocated IP address from the central access router . An SNMP agent provides management by RADview or any other standard SNMP management station. The automatic bypass feature for sub-E1/T1 provides automatic join-up of timeslots on E1/T1 and sub-E1/T1 links in the event of power failure. Quick setup is performed via a terminal attached to the control port, or by using Telnet access to the device over the LAN or WAN

WEB RANger-II

Equipment		Order Number
WEB RANger	T1, 10BT	RWR2/T1/U
WEB RANger	T1, 10BT, DSX-1	RWR2/T1/U/S
WEB RANger	E1, 10BT	RWR2/E1/U
WEB RANger	T1, 2 10BT	RWR2/T1/2U
WEB RANger	V.35 , 10BT	RWR2/V35/U
WEB RANger	V.35, 2 10BT	RWR2/V35/2U

Call Pulse for more options including DC power, analog voice interfaces and rack mount kits.



TinyRouter Miniature Low Cost IP Router

TinyRouter is a high performance, miniature IP router. It is based on RAD's unique IP router chip, the ChipRouter, and therefore operates with minimal software. Its small size and low cost make it ideal for cost-sensitive routing applications. It requires only one software parameter to be configured making it a plug and play device. TinyRouter is available with 10Base5 (AUI) or 10BaseT (UTP) interfaces and is fully IEEE 802.3 / Ethernet v2 compliant. The 10BaseT interface can also operate in full duplex Ethernet applications. A choice of WAN interfaces is available, including V.24, V.35, V.36, X.21, RS-530, fiber optic or internal 4-wire modem. In the case of electrical WAN interfaces, the TinyRouter acts as a DTE device to the WAN. The integral 4-wire interface allows wire speed routing over copper cabling in the campus, up to distances of 1300m/4265 ft depending on cable type. TinyRouter provides hardware based traffic throughput control at user configured speeds of 64 kbps, 128 kbps, 512 kbps, 1 Mbps and 10 Mbps. TinyRouter can operate with asymmetrical Tx and Rx speeds.

Ultra Miniature Router!

TinyRouter

Equipment		Order Number
TinyRouter	UTP, V.35	TINYRT/U/V35
TinyRouter	UTP, RS-530	TINYRT/U/530
TinyRouter	UTP, RS-232	TINYRT/U/V24
TinyRouter	4W MDM, UTP	TINYRT/U/4W

A more cost effective TinyBridge is also available for applications that do not require routing. Call Pulse for more details and ordering options.

RAD data communications

RIC-E1, RIC-T1 Interface Converters

RIC-E1 and RIC-T1 interface converters enable communication between devices with E1/T1 interfaces and equipment with V.35, X.21, V.36, RS-530 interfaces.

Ethernet Bridge Option

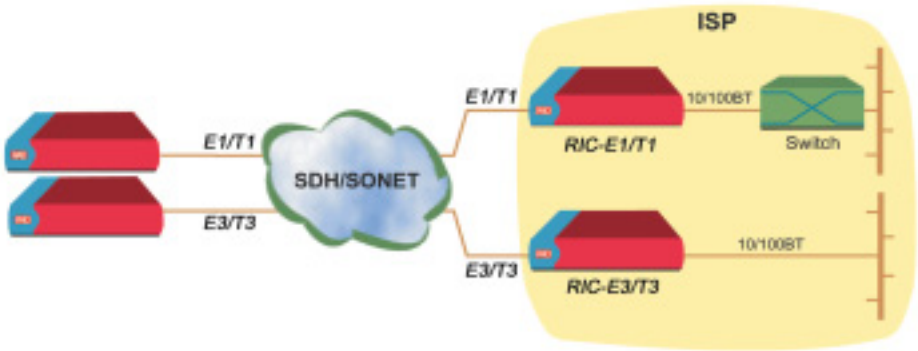
When equipped with IR-ETH/QN interface module, RIC-E1 and RIC-T1 transparently connect remote LANs and VLANs over unframed E1/T1 links utilizing the full E1/T1 bandwidth. The IR-ETH/QN interface modules support autonegotiation, allowing connection without additional configuration.

Ethernet IP Gateway Option

RIC-E1 and RIC-T1 equipped with the IR-IP interface module operate as IP gateways, forwarding IP packets destined to the IP network. This prevents broadcast to the WAN and enables the LAN users to register for an IP multicast service.

RIC-T1, RIC-T1

Equipment	Order Number
T1, Bridging Option	RIC-T1/AC/UTP/IP
T1, IP GW Option	RIC-T1/AC/UTP/QN
E1, Bridging Option	RIC-E1/AC/UTP/IP
E1, IP GW Option	RIC-E1/AC/UTP/QN
T1, Bridging Option DC	RIC-T1/DC/UTP/IP
T1, IP GW Option DC	RIC-T1/DC/UTP/QN
E1, Bridging Option DC	RIC-E1/DC/UTP/IP
E1, IP GW Option DC	RIC-E1/DC/UTP/QN



RIC-E3/ETH, RIC-T3/ETH 10/100BT to E3/T3 Converters

RIC-E3/ETH and RIC-T3/ETH, interface converters, offer simple, cost-effective connection between E3/T3 services and 10/100BaseT LANs.
RIC-E3/ETH and RIC-T3/ETH transparently connect unframed E3/T3 and 10/100BaseT links, utilizing the full E3/T3 bandwidth without heavy overhead associated with packet or cell-based technologies. Built-in Ethernet bridge with VLAN support enables virtual LAN connections.

The Ethernet interface module performs frame filtering and forwarding at the Fast Ethernet maximum theoretical rate of 150,000 frames per second. The bridge causes no LAN delays. The converters provide full control over the multicast and broadcast messages, which can be forwarded from LAN to WAN or blocked from it. RIC-E3/ETH and RIC-T3/ETH support auto-negotiation, which allows plug-and-play Ethernet connection without any additional configuration.

RIC-T3/ETH, RIC-E3/ETH

Equipment	Order Number
T3, DC Power	RIC-T3/DC
T3, AC Power	RIC-T3/AC
E3, DC Power	RIC-E3/DC
E3, AC Power	RIC-E3/AC

ADTRAN

NetVanta 3000 Series Access Router

NEW from ADTRAN

The NetVanta 3000 series of access routers from ADTRAN, offer small-to-medium size businesses the most cost-effective way to connect branch offices together using Frame Relay and point-to-point digital circuits. These versatile platforms are modular indesign and are a full-featured, low-cost alternative to other brand name routers. They include a single slot used to house a variety of interchangable Network Interface Modules (NIMs) and Dial Backup Interface Modules (DIMs).

Functioning as the inteligence behind the information flow, the ADTRAN Operating System (OS) makes quick and responsive IP routing decisions. The ADTRAN OS supports static and default routes, and allows for fast, accurate network convergence supporting routing protocols like RIP version 1 and version 2. From a management perspective all the NetVanta 3000 Series are centrally managed using the Command Line Interface (CLI). ADTRAN's CLI mimics the industry defacto standard eliminating any re-training cost, and requires no costly industry certification courses.

The versatile NetVanta 3000 series is a complete turnkey solution with unsurpassed performance for customers requiring wide area connectivity. The NetVanta 3000 Series can effortlessly merge into an existing network with other brand name routers without disrupting day-to-day networking operations. In addition, these products are backed by an industry leading 5-year warranty and ADTRAN's world-class 24 hour technical support.

Also available with IPsec VPN supporting DES/3DES/AES Encryption

3000 Series

Equipment	Order Number
NetVanta 3200 Chassis	ADTN1202860L1
NetVanta 3205 Chassis	ADTN1200870L1
NetVanta 3305 Chassis	ADTN1200880L1
NetVanta 56/64K NIM	ADTN1200861L1
NetVanta T1/FT1 NIM	ADTN1200862L1
NetVanta T1/FT1+DSX-1 NIM	ADTN1200863L1
NetVanta Serial NIM	ADTN1200866L1
NetVanta Analog Modem NIM	ADTN1200864L1
NetVanta ISDN BRI DIM	ADTN1200865L1

Systems	Order Number
NetVanta 3200 with 56/64K NIM	ADTN4200861L1
NetVanta 3200 with T1/FT1 NIM	ADTN4200862L1
NetVanta 3200 with T1/FT1+DSX-1	ADTN4200863L1
NetVanta 3200 with serial NIM	ADTN4200866L1
NetVanta 3205 with 56/64K NIM	ADTN4200871L1
NetVanta 3205 with T1/FT1 NIM	ADTN4200872L1
NetVanta 3205 with T1/FT1+DSX-1	ADTN4200873L1
NetVanta 3205 with serial NIM	ADTN4200876L1
NetVanta 3305 with T1/FT1 NIM	ADTN4200882L1
NetVanta 3305 with T1/FT1+DSX-1	ADTN4200883L1

Pulse supplies the complete line of Cisco Access Routers

- 800 Series
- 1700 Series
- 2600 Series
- 3600/3700 Series

Give Pulse a call with any application in which you may be interested.
We are here to support you.

NetVanta 2050 and 2100 Series

NetVanta™ 2050 and 2100

The ADTRAN NetVanta™ 2050 and 2100 are small office/home office VPN/Security gateways providing all the necessary components required to secure an integrated VPN solution. Used primarily for remote access, the NetVanta 2050 is perfect for work-at-home telecom-muters, while the NetVanta 2100 addresses the small office or corporate branch office. Each provide key security and data manage-ment features such as IPSec VPN tunneling, stateful inspection firewall, built-in router, authenticated remote user access, and Network Address Translation. VPN Tunneling: The NetVanta 2050 and the 2100 are IPSec compliant devices that provide secure communication over potentially unsecure network components. As a security gateway, the NetVanta 2050 can provide five private encryption communication tunnels supporting up to 15 users, while the NetVanta 2100 can provide up to 10 private encryption tunnels with unrestricted number of users.

NetVanta™ 2300

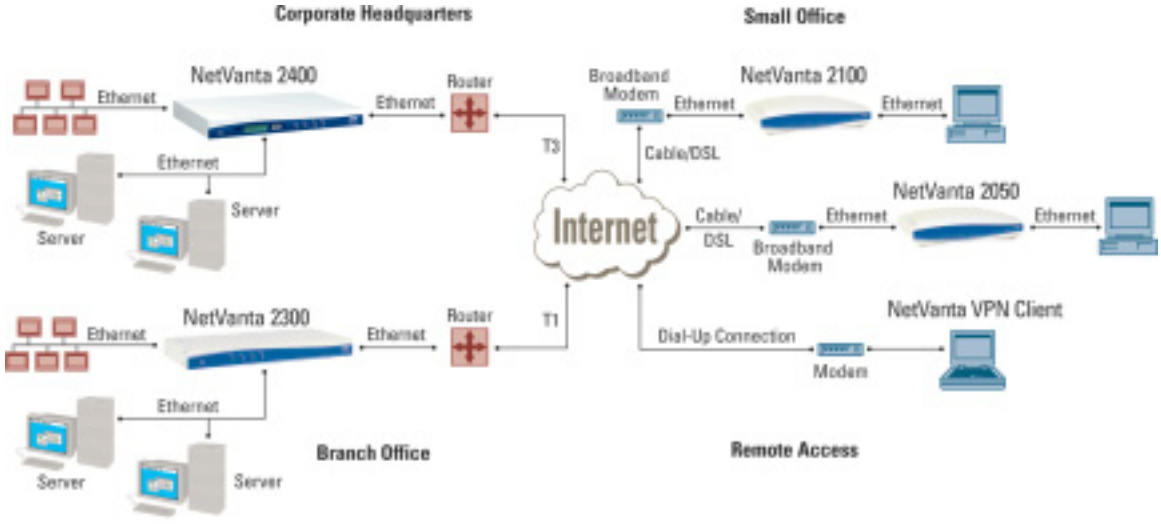
The ADTRAN NetVanta ™ 2300 is a mid-range IPSec compliant gateway providing all the necessary components required to secure an integrated VPN solution. As a branch office or mid-size host security gateway, the NetVanta 2300 provides several key security features such as IPSec VPN tunneling with DES or 3DES encryption, stateful inspection firewall, and IKE for user authentication supporting public/private keys or digital certifi-cates. In addition, it also offers a DMZ port for public server access, a hardware encryption accelerator for faster encryption throughput and up to 100 simultaneous VPN tunnels.

NetVanta 2300 and 2400 Series

NetVanta™ 2400

The ADTRAN NetVanta™ 2400 is a corporate host IPSec compliant gateway providing all the necessary components required to secure an integrated VPN solution. As a large host security gateway, the NetVanta 2400 provides several key security features such as IPSec VPN tunneling with DES or 3DES encryption, stateful inspection firewall, and IKE for user authentication supporting public/private keys or digital certifi-cates. In addition, it also offers a DMZ port for public server access, a hardware encryption accelerator for faster encryption throughput and up to 1,000 simultaneous VPN tunnels.

Equipment	Order Number
NetVanta 2050	ADTN1202362L1
NetVanta 2100	ADTN1202361L2
NetVanta 2300	ADTN1200366L1
NetVanta 2400	ADTN1200367L1
VPN Client (5 Users)	ADTN1200360L1#5
VPN Client (10 Users)	ADTN1200360L1#10
VPN Client (50 Users)	ADTN1200360L1#50
VPN Client (100 Users)	ADTN1200360L1#100
RM 10 Shelf - Cream	ADTN1200088L1
RM 10 Shelf - White	ADTN1202088L1



Wireless Broadband

ADTRAN

TRACER Wireless 2xT1, 2xE1 and E1 Systems

ADTRAN's TRACER® is an unlicensed digital microwave radio that uses spread-spectrum technology to provide two independent T1/E1 communication links. As authorized under part 15.247 of the FCC rules, TRACER operates in the 2.4 to 2.4835 GHz and 5.725 to 5.850 GHz industrial, scientific, and medical (ISM) band. TRACER equipment can operate license-free in the U.S. and many other countries. TRACER is the industry's first National Equipment Building System (NEBS) Level 3 compliant spread-spectrum radio. This means that TRACER has met the strict requirements for performance, quality, and safety required by the Regional Bell Operating Companies (RBOCs) for equipment installed in their Central Offices.

TRACER Rackmount

TRACER Mastmount

Equipment	Order Number
2xT1 2.4GHz Rackmount	4280TRACERT1L7
2xT1 2.4GHz Mastmount	4280TRACERT1L8
2xT1 5.8GHz Rackmount	4280TRC582TR1
2xT1 5.8GHz Mastmount	4280TRC582TM1
2xE1 2.4GHz Rackmount	4280TRC242E75R1
2xE1 2.4GHz Mastmount	4280TRC242E75M1
2xE1 5.8GHz Rackmount	4280TRC582E75R1
2xE1 5.8GHz Mastmount	4280TRC582E75M1
Tracer AC Adapter	1360DSK24VL1

TRACER® 4103/4203

Lowest Cost T1 Radio!

ADTRAN's TRACER®4103 and TRACER 4203 are license-free spread spectrum digital microwave radios designed to deliver dual T1 capacity from a single compact platform at an extremely economical price. These radios combine the functionality of Baseband Processing and Radio Frequency Conversion into a single 1U (1.75") x 19" chassis. TRACER 4000 Series radios are excellent wireless connectivity solutions for applications where cabinet or rack space is limited.Exciting additions to ADTRAN's widely deployed TRACER Series, the TRACER 4103 and 4203 transport two independent T1 digital signals up to 30 miles point-to-point. TRACER 4103 operates at 2.4 GHz and TRACER 4203 operates at 5.8 GHz in the Industrial, Scientific, and Medical (ISM) frequency band as authorized under Part 15.247 of the FCC rules.

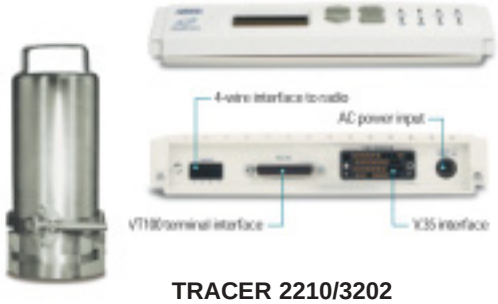
TRACER 4103/4203
Dual T1 Radio

Equipment	Order Number
TRACER 4103, Freq A 2.4GHz	1280TRC242T1R1A
TRACER 4103, Freq B 2.4GHz	1280TRC242T1R1B
TRACER 4203, Freq A 5.8GHz	1280TRC582T1R1A
TRACER 4203, Freq B 5.8GHz	1280TRC582T1R1B
AC Power Supply	1280650L1

TRACER 2210/3202 Wireless Serial System

The 2210/3202 provides a single V.35 interface for data applications at Nx64 rates up to 1.536 Mbps. The 2210 Data Interface Unit (DIU) is a tabletop unit powered from a 110VAC external power supply (included) that provides the V.35 data interface. The 3202 is the 5.8 GHz Radio Interface Unit (RIU) housed in a weather-proof housing designed to mounted next to the antenna.

TRACER 2210/3202 is capable of achieving distances up to 30 miles. As authorized under Part 15.247 of the FCC Rules, the TRACER 2210/3202 operates license-free in the 5.725 to 5.850 GHz industrial, scientific and medical (ISM) band.



TRACER 2210/3202

Equipment	Order Number
Frequency A	428022103202L1A
Frequency B	428022103202L1B

TRACER® 4205 and 4305 DS-3 Radio

ADTRAN's TRACER 4205/4305 is a license-free digital microwave radio that provides economical, full-duplex DS-3 connectivity for service providers and corporate networks. The TRACER 4205/4305 DS-3 wireless solution offers 45Mbps of broad-band connectivity in many locations at a significantly lower cost than competing products. The monthly cost savings generate a rapid return on investment while lowering overall communications costs. Additionally, in applications where quick installation and time-to-market are essential, or existing high bandwidth infrastructure is inadequate or nonexistent, the TRACER 4305 will provide rapid deployment and reliable carrier-grade service.

Tracer 4205/4305

Equipment	Order Number
TRACER 4305 U-NII Band	12804305L1
TRACER 4205 5.8GHz	12804205L1
AC Power Supply	1280650L1

TRACER® 5045 45Mbps Ethernet Radio

The ADTRAN™ TRACER 5045 is a license-free wireless data transport device that provides 90 Mbps (45 Mbps full duplex) packet-data connectivity for Ethernet applications. It combines the benefits of a 90 Mbps bridge, with an integrated four port Ethernet switch in a compact, energy-efficient form factor. This product provides cost-effective data transport between locations within a 25-mile path, point-to-point, when wireline access is unavailable or cost-prohibitive.

Housed in a space saving 1U chassis, one-half the size of other rackmount solutions, the TRACER 5045 offers customers unmatched energy efficiency. Designed to operate in the 5.8 GHz ISM band, this product uses one-half the power of comparable U-NII band products, while producing twice as much transmit power. Believed to be the industry's first ISM band radio with combined bridging/switching functionality, the TRACER 5045 also allows longer effective link distances to be obtained because there are no radiated power limitations in this band.

Tracer 5045

TRACER® 4106/4206 4xT1 Radio

The TRACER® 4106 and 4206 are license-free digital microwave radios from ADTRAN™, that provide economical, wireless, high-capacity connectivity for service providers and corporate networks. The TRACER 4106 operates in the 2.4 GHz ISM band while the TRACER 4206 operates in the 5.8 GHz ISM band to provide high bandwidth wireless solutions, at a significantly lower cost than competing products. The monthly cost savings of ADTRAN's license-free wireless solutions generate a rapid return on investment while lowering overall communications costs. Additionally, in applications where quick installation and time-to-market are essential, or where existing high bandwidth infrastructure is inadequate or nonexistent, the TRACER 4106/4206 radios will provide rapid deployment and reliable carrier-grade connectivity.

TRACER® 4108/4208 8xT1 Radio

The TRACER® 4108/4208 are scalable, license-free, digital microwave radios from ADTRAN™ that provide economical, wireless, high-capacity connectivity for service providers and corporate networks. TRACER 4108/4208 provides up to eight T1s allowing users to grow their networks as system requirements migrate. The TRACER 4108 operates in the 2.4 GHz ISM band, while the TRACER 4208 operates in the 5.8 GHz ISM band to provide high bandwidth wireless solutions, at a significantly lower cost than competing products. Additionally, in applications where quick installation and time-to-market are essential, or where existing high bandwidth infrastructure is inadequate or nonexistent, TRACER 4108 and 4208 radios provide rapid deployment and reliable carrier-grade connectivity.

Equipment	Order Number
TRACER 5045	
TRACER 5045, Freq A	12805045L1A
TRACER 5045, Freq B	12805045L1B
AC Power Supply	1280650L1
TRACER 4106/4206	
TRACER 4106, Freq A	12804106L1A
TRACER 4106, Freq B	12804106L1B
TRACER 4206, Freq A	12804206L1A
TRACER 4206, Freq B	12804206L1B
AC Power Supply	1280650L1
TRACER 4108/4208	
TRACER 4108, Freq A	12804108L1A
TRACER 4108, Freq B	12804108L1B
TRACER 4208, Freq A	12804208L1A
TRACER 4208, Freq B	12804208L1B

Wireless Broadband

WI-LAN Ultima3 5.8GHz, 12Mbps Ethernet Radio

Wi-LAN, the technology leader in Broadband Wireless Solutions, introduces the AWE 120-58 Ultima3 series for service providers and enterprise customers. Operating at **12Mbps**, the Ultima3 combines the power of broadband with the freedom of wireless. The Ultima3 benefits from the experience gained in having the largest number of **5.8 GHz** multipoint networks deployed today.

Available in three distinct solutions, Wi-LAN's Ultima3 is guaranteed to provide your network unprecedented ease of deployment, simplicity of operation, and the most comprehensive range of features available.

Multi-Point (MP)
From a single Access Point (AP), Wi-LAN's Ultima3 MP solution provides broadband coverage of up to 16 km (10 miles) to 1000 Customer Premise Equipment (CPE). Compatible with previous AWE 120-58s, and including features such as CIR and MBR, the Ultima3 MP gives your network the flexibility to grow with your business.

Rapid Deployment (RD)
When you need a link FAST, the Ultima3 RD is your choice. Truly the easiest point-to-point product available today, its lightweight one-piece design allows for quick installation, giving exceptional performance for links up to 25 km (16 miles).

Extended Range (ER)
Stretch beyond the limits with the Ultima3 ER. Extend your point-to-point networks to ranges up to 75 km (47 miles). Choosing the range you need is as easy as choosing the right antenna for the right job.

Ultima3 ER and AP

Ultima3 RD and CPE

Equipment	Order Number
Ultima3 Rapid Deployment	9110-0036
Ultima3 Extended Range	9110-0037
Ultima3 Access Point	9110-0035
Ultima3 CPE	9110-0034
Ultima3 - 40 km ER Bundle	9000-0038
Ultima3 - 75 km ER Bundle	9000-0039
5.8GHz Omni 11dBi Antenna	1200-0515
5.8GHz 55° H-Sector 17dBi	1200-0400
5.8GHz 55° V-Sector 17dBi	1200-0401
5.8GHz Antenna 28.5dBi	1200-0503
5.8GHz Antenna 34.2dBi	1200-0501
5.8GHz Antenna 37.5dBi	1200-0500

Call Pulse for more options and configurations.

WI-LAN AWE 120 2.4GHz Radio

Wi-LAN's AWE 120-24 advanced wireless Ethernet bridges give you the most bandwidth for your investment. Taking into account list prices and effective data rates of up to 9 Mbps, the Wi-LAN AWE 120-24 offers the best price-per-megabit performance available today. And the high reliability of the Wi-LAN advanced wireless Ethernet bridges make them ideal for critical applications.

Built with Wi-LAN's patented Multi-code Direct Sequence Spread Spectrum (MC-DSSS) technology, the AWE 120-24 is spectrally efficient and more resistant to interference. Using advanced wireless Ethernet bridges with MC-DSSS presents constant service over distance through increased data rates and enhanced reliability.

AWE 120-24

Equipment	Order Number
AWE 120-24 2.4 GHz, 12 Mbps	9110-0050

Call Pulse for more options and configurations.

Wi-LAN VIP 110-24 2.4GHz, 11Mbps Radio

Overcoming Non Line-of-Sight Obstacles with Patented VINE Technology

Wi-LAN's patented wireless VINE technology is a new networking technology that overcomes the non line-of-sight obstacles and minimizes initial up-front costs of developing networks. VINE technology focuses on overcoming the LOS issues imposed by challenging terrain topography. As your network grows, any node can be promoted to become a repeater; the only requirement for a new node to get attached is to have RF connectivity to any node already in the network - a deployment strategy called anypoint-to-multipoint, since any node already in the network can become the centre of a point-to-multipoint branch. Hard to reach locations that are obstructed can easily be reached once the VINE spreads into that neighbourhood.

The VIP 110-24 was specifically designed to operate over long distances. All the electronics are enclosed in an environmentally sealed outdoor unit that is mounted in close proximity to the antennas in your network. This outdoor unit effectively reduces installation time and eliminates the cable loss, thereby increasing the range. For long-range links, where the antennas need to be mounted on towers and rooftops, this configuration reduces costly RF cables and improves RF system performance.

Wireless networks based on the VIP 110-24 can be deployed one node at a time without an expensive upfront infrastructure. Each unit contains complete functionality to operate as a hub, repeater or an end node.

VIP 110-24

Equipment	Order Number
VIP 110-24, 110VAC	VIP 110-24
VIP 110-24, 220VAC	VIP 110-24-2
10 dBi, H Omni Antenna	ATA-2300
10 dBi Sector Antenna 180°	ATA-2304
13.5 dBi Sector Antenna 60°	ATA-2404
12 dBi Sector Antenna 90°	ATA-2404
14 dBi Sector Antenna 120°	ATA-2404
100 ft. Cat 5 cable, connectorized	C1062-005-100
200 ft. Cat 5 cable, connectorized	C1062-005-200
300 ft. Cat 5 cable, connectorized	C1062-005-300
Power Inserter, 110VAC to 24VDC	PI110VIP
Power Inserter, 220VAC to 24VDC	PI220VIP

Contact Pulse for wireless network design assistance and path analysis.

LIBRA 3000/5800 OFDM Products

Wi-LAN's LIBRA 3000/5800 unleashes the power of non-line-of-sight (NLOS) to fixed wireless access. Operating in the licensed 3.5 GHz frequency band and unlicenced 5.8GHz band, LIBRA provides scalable, field proven performance in a simple, easy to install package. W-OFDM powered technology ensures that Service Providers and Competitive Carriers can provide better service to more customers at a lower cost than traditional wireless solutions.

The world's first and only 3rd generation W-OFDM CPE is founded on the experience of network installations in over 20 countries. LIBRA's integrated form factor, complete with PDA support and quick start menus, makes deployment a breeze. Proven NLOS coverage simplifies installation even further and can dramatically increase the customer base with no increase in cost.

Wi-LAN understands the needs of your growing business, where revenue and profit must occur quickly, not further down the road. A range of 24 km combined with W-OFDM's superior NLOS capabilities, LIBRA 3000/5800 gives you the power to reach previously inaccessible customers. Extended features like VLAN support, CIR/MBR, and over-the-air software upgrades enhance service revenues and contain costs, getting your network running smoothly as soon as possible.

LIBRA Outdoor Unit

LIBRA Base Station

Equipment	Order Number
Call for ordering information	

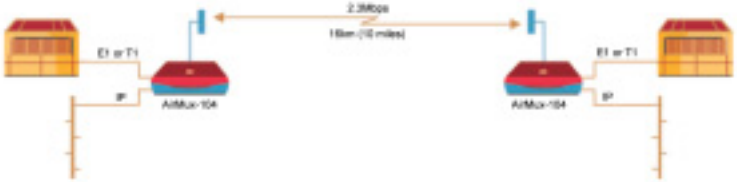
Wireless Broadband

AIRMUX-104 T1/E1/Ethernet Microwave Radio
AirMux-104 transmits E1 or T1 and Ethernet traffic at distances of up to 16 km (10 miles). An optional flat panel 28 dBi external antenna increases the operation range to 40 km (24.8 miles).

A powerful Forward Error Correction (FEC) mechanism is used to ensure integrity of transmission, providing higher quality of service with BER as low as 1E-10 in optimal conditions.

The multiplexer consists of an outdoor radio terminal and an indoor radio terminal connection unit.

AIRMUX-104



Equipment	Order Number
Oudoor Unit T1	AIRMUX-104/OD/T1
Indoor Unit T1	AIRMUX-104/ID/T1
Oudoor Unit E1	AIRMUX-104/OD/E1
Indoor Unit E1	AIRMUX-104/ID/E1

Wireless Network Installation and Design Services

- Path Analysis
- Path Survey
- Site Evaluation
- Loss Budget
- Total System Design
- System Installation

Pulse is a full service microwave system distributor, designer and installer. Systems operating in both licensed and unlicensed frequency spectrums are available for point to point, point to multipoint and wireless Ethernet applications. Some of the wireless equipment manufacturers represented by Pulse are Adtran, Wi-LAN, Proxim, P-COM and Alvarion.

Please contact your nearest Pulse office for more wireless network service information.

Equipment Racks

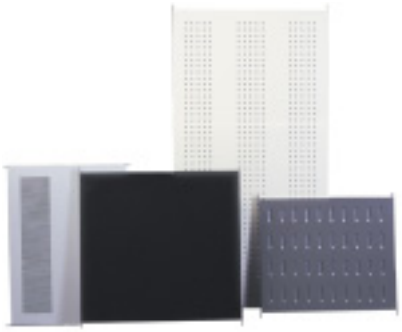
pepco MANUFACTURING CO.

Features:
Steel frame with full welded construction
Two pair fully adjustable EIA-310 tapped mounting rails.
Optional two pair universal mounting rails.
Ganging holes allow cabinets to be bolted together.

Accessories:
Aluminum frame smoked Plexiglas doors
Steel frame smoked tempered glass doors
Full length rear door (solid, louvered or mesh)
Two piece rear doors available for 19, 23, and 24" cabinets.
Removable swing-out side panels.
Removable top panels (solid, vented, louvered, and mesh)
Power strips available for all specifications
550 CFM fan unit, 110 volt standard (220 volt available)

Specifications:
Material: .060 (16 gauge) CRS Finish: Textured baked enamel
Colors: Pearl white, IBM blue, black, driftwood grey
Custom colors and color matching available

Dimensions:
Width: 19, 23, 24 and 48" rack mount
Height: 45 1/2, 70, and 77" vertical rack mount
Depth: 24, 30, and 36"



Shelf and Drawer Features:
Flat, Cantilevered, Keyboard Drawer, Rotating KB Shelf and Drawers available
Solid, Louvered, or Mesh (perforated) Four point mounting
Standard Shelves (Capacity: Static load of 250 lbs.)
Heavy Duty Shelves (Capacity: Static load of 600 lbs.)
Specifications:
Material: .060 (16 gauge) CRS Finish: Textured, baked enamel
Colors: IBM Blue, black, pearl white, driftwood grey or any custom color
Dimensions:
Available in 19, 23, 24, and 48" rack mount widths
Available in 18, 21, 24, and 30" depths. Custom sizes also available.

- All cabinets are custom assembled to meet your specifications.
- Cabinet delivery is available within 5 days of leaving our warehouse.
- Custom features and modifications can be added for a small cost.
- Steel and aluminum open relay racks are also available.

Please call your nearest Pulse office for ordering assistance.

Services Available

Pre-Sales Telephone Support
Pre-sales support is always provided at no cost to customers. We can quickly determine your specific needs and make a recommendation.

Post Sales Telephone Support
Our highly trained engineers are available to walk you through the most challenging installations.

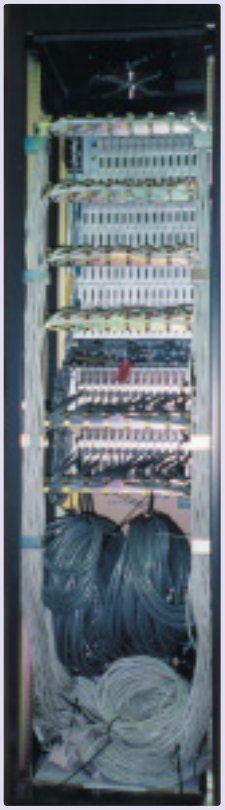
Consulting Services
Pulse can show you how to speed up your existing network or change it to bring your company up to speed.

Nationwide installation services
Nationwide installation is available for all products sold and serviced by Pulse.

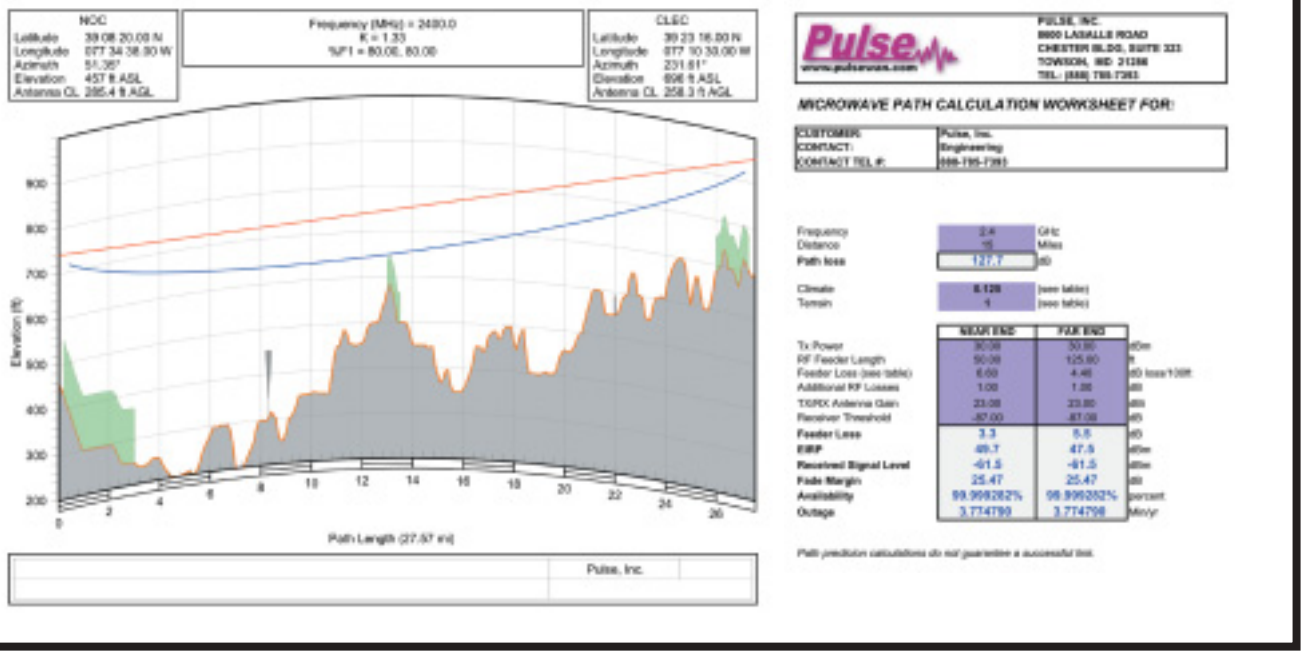
Network Diagnostics and Analysis
Pulse provides complete LAN and WAN analysis. Our specially trained engineers use state of the art analysis tools to diagnose the cause of most network problems and outages.

Wireless Network Design and Installation
Pulse can design your wireless network and provide detailed path analysis reports and link reliability projections.

Have your system pre-configured, staged and shipped anywhere in the world!



Wireless Network Path Calculations



T1/E1 Over IP!

RAD data communications

IPmux-1/1E

IPmux-16

IPmux-8

IPmux TDMoIP Gateways

IPmux provides a compact, minimal configuration solution for virtual E1/T1 and ISDN BRI point-to-point applications, transporting these services over IP and Ethernet based networks. IPmux takes data streams from up to 16 E1/T1 or BRI (IPmux-1E) ports and converts them to packets for transmission over the network. The addressing scheme of these frames is IP. These frames are transmitted via the IPmux 10/100BaseT port to the network. A second IPmux at the remote location converts the IP packets back to E1/T1 traffic. The overall effect of the IPmux is to allow transparent E1/T1/BRI connectivity over the new generation of switch based packet networks, both in the carrier and the corporate environments.

A standard 10/100BaseT half/full duplex port with auto-negotiation support provides the uplink to the network. Either one or four, eight, twelve or sixteen standard E1/T1 ports provide connectivity to any standard E1/T1 user device. The IPmux conforms with AT&T TR-62411, ITU-T G.703, G.706, G.732, G.823 and ANSI T1.403 standards.

IPmux can achieve end to end (E1/T1 port to E1/T1 port) delay as low as 1 ms, using high performance buffering and forwarding techniques. It also supports synchronization between the two E1/T1 devices, using either the clock of the E1/T1 network, or using its internal adaptive mode.

The IPmux is available with the following ordering options. Please contact your nearest Pulse office for ordering assistance.

- **1, 4, 8, 12 or 16 T1/E1 Ports and DS-3**
- **AC (100-240 VAC) or DC (-48 VDC) Power**
- **Redundant Power Supply (optional)**

- **Transports E1/T1 TDM services and circuits over IP networks**
- **Totally transparent to all signaling protocols running over E1/T1**
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- **End to end delay starting from 1 ms**
- **Supports transport of both transparent E1 and fractional E1/T1**
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- **Supports packet delay variation up to 32 ms for E1 and 24 ms for T1**
- **Enables point to point applications**
- **Supports IP level priority (TOS)**
- **Supports Mac level priority**
- **IEEE 802.1-p&q**
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